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PREFACE.

In our address at the conclusion of the previous volume, we stated confidently, that our resources would enable us to continue progressively improving the work, in interest, variety, and originality; a review of our subsequent labours, will, we are assured, attest the honesty of our motives in making that statement; and establish the fact, of the improvement being considerable.

It is with feelings of exultation we observe, that the present volume contains, (in addition to the very numerous unpatented inventions and discoveries) *descriptive accounts of upwards of one hundred new patents*, (most of which have appeared in no other publication) which is in reality more than double the number described in *any* volume published by our contemporaries; not excepting those, who invidiously contra-distinguish themselves by the term "*major periodicals*," as if they were major to us in aught but the *price*. We have two reasons for mentioning this circumstance here; first, to answer the silly distinctive appellations set up by some of our contemporaries; and, secondly, because we are anxious that our readers and the public should know, that the information we obtain, by great diligence, expense, and exertion, we transmit to them for a very moderate compensation.

It is also due to our readers, to explain the cause of our having for a long period omitted the continuation of the series of papers, commenced in our last volume, entitled "A Comparative view of Foreign and British Machinery and processes

in the Arts." It was an oversight on our part, not to have mentioned at the outset that those papers would be considered as secondary to descriptions of new patent inventions, as the latter possess more *general* interest; we were not also aware, at that time, that our ability was adequate to the furnishing of so great and unprecedented a body of English patents, as we have recently published. We shall, however, soon make arrangements for the continuation of the subject, and we hope to be able to include in the next volume, a general view of the state of the arts in the great peninsula of India; the illustrations to which will be all original, and sketched by ourselves from models brought over to England a few years ago, for the purpose of making the British public acquainted with that subject. We hope to do this, without reducing the number of new patents, the specifications of which will be carefully condensed, wherever it can be done with propriety.

We renew our thanks to our Correspondents for their valuable assistance afforded to us by their talented contributions, and earnestly solicit a continuance of their kind support.

1st November, 1828.

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Fig. 1.

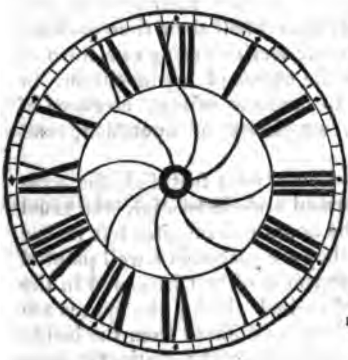


Fig. 2.

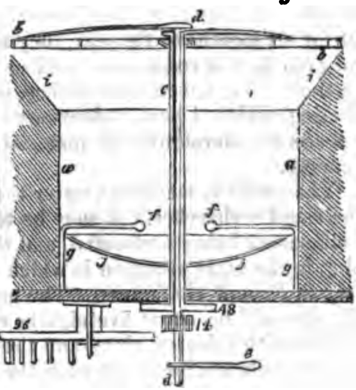
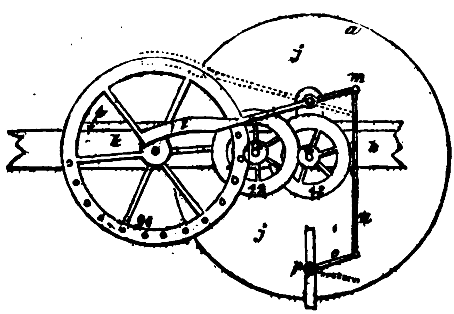


Fig. 3.



THE SELF-ILLUMINATING CLOCK OF ST. GILES'S CHURCH, LONDON.

SELF-ILLUMINATING CLOCK OF ST. GILES'S CHURCH, LONDON

By Mr. Paine, of 39, High Street, Bloomsbury.

In compliance with the expressed wishes of many of our subscribers, we this week commence a description of the method of illuminating the Public Clocks, and have selected as the first that at St. Giles's Church, being the most convenient to us, an account of it having just been given in the Transactions of the Society of Arts, from whence the following are abbreviated extracts.—

39, High Street, Bloomsbury,
April 8, 1827.

Sir—The model I have this day the honor to exhibit to your consideration has long occupied my closest attention, as I consider there is no object to which mechanism is applied of more importance than our public time-keepers, and which I lament have by no means kept pace with the improvements introduced into other branches of the art. It is true, the hands continue to perform their revolutions; but for six months of the year, they are nearly half their time useless: and even for the remainder, we lose their service during one-third of the time. To remedy this defect, is the object of my invention, in effecting which, I have endeavoured to combine utility, elegance of appearance, durability of material, simplicity of operation, and economy.

The model is made to quarter the size of a six feet dial, the average size for churches. It may be termed a skeleton dial, the usual blank spaces being perforated, and the hours and minutes left in the solid, in the exact situation in which they are placed in a well painted dial, in Roman characters. The material is of cast iron, and in the full size will be about five-eighths of an inch thick; the spaces are filled in with coloured glass, and the light so diffused from the inside that not only the hour, but even the minutes may be distinctly seen by night; and during the day, the deep colour of the glass will give the clock face a dark appearance; this is not to be obtained by using common ground glass, which shows white, and looks poor with only a black letter painted on it. The model also exhibits a plan, which, by the revolution of the motion of the hands with the addition of only one wheel and pinion, lights up the dial itself, and extinguishes the same at any period of time that may be necessary, and by simply withdrawing or adding a pin once a month, according as the days increase or decrease in length, it will vary its time of operation accordingly; so that whether it is required to be lighted at four o'clock in the afternoon, and to burn till eight in the morning, or not to light up till nine at night, and to be put out at three, as in the longest and shortest day, it is always punctual in its operation at the given period. I trust the simplicity of the means by which this is effected, will meet your approbation. The dial being made of framed work, allows of its being glazed with small pieces, and therefore if broken, of being

restored at a trifling expense; the joints of the glass are behind the letters, and thus any indistinctness which might otherwise be occasioned by them is avoided. I shall be happy to exhibit the model in full operation before the Committee, at any time that they may appoint.

I am, Sir, &c. &c. &c.

J. P. PAINE.

A. Aikin, Esq. Secretary, &c. &c.

Mr. Paine's object is to render the dial of a church or other turret clock visible by night, and also to obviate the necessity of a person going twice every day up to the clock for the purpose of lighting and extinguishing the jet. During the day no more gas is expended than is sufficient to keep up the smallest possible flame, and during the night the flame is large enough to answer the intended purpose. The actual consumption of gas in the clock of St. Giles's church, fitted up by Mr. Paine himself, is fourteen cubic feet during the day, and fifty-six cubic feet during the night.

Certificates were produced from the parish officers, highly approving Mr. Paine's plan; and at the last meeting of the committee on the 21st of May, it appeared that the jet had continued constantly alight for a month.

The illumination of public clocks, is practised with more or less success in various places. At Glasgow the jet is on the outside of the dial-plate; and at Manchester the mode of illumination from within has been for some years adopted, the light, however, is not regulated by the motion of the clock, as in Mr. Paine's dial, but the jet is lighted and extinguished by hand like other gas-lamps.

Reference to the Engraving.—Figure 1 represents a skeleton frame dial, cast all in one piece; the eight central divisions are very thin, and curved, so as not to coincide or interfere with the hands while passing over them; the spaces are all filled up with transparent red glass, ground rough on the inside; this by day is sufficiently dark to relieve and render distinctly visible the gilt hour numbers; but at night, when the gas-burners behind the dial plate are lighted up, the hours, minutes, and hands, appear black, and the rest of the dial glows with a dusky red light.

Fig. 2 is a horizontal section across the aperture *a a* in the church tower at the back of the dial *b b*; *c* the tube which carries the hour hand, having a balance weight, and the wheel 48 on its inner end; through this passes the shaft *d d* holding at one end the minute hand, and at the other end the pinion 14, and balance weight *e*; *f f* two gas-burners; *g g* the tubes supplying the gas; the aperture *a a*, not being as large as the dial, is chamferred off at *i i*, to give a clear passage from the lights all over the dial; *j j* a curved reflector, made of sheets of tin; *k k* a bar crossing the aperture *a a* within, to support the motion wheels, and the additional twenty-four hour wheel 96; the long axis *d d* receives motion from the clock, (as usual) by a bevel wheel: 14, 42, 12, and 48, fig. 3, are the usual motion wheels and pinions; an additional pinion of 12 is put on the wheel 42 to turn the wheel 96, this has thirteen pins, one hour's motion apart; these pins

raise up the weighted lever *l* in fig. 3, and let it drop; while this is up (as shewn by the dotted lines), its opposite end *m*, by means of the connecting rod *n*, keeps the lever handle *o* of the gas cock *p* down, and thus nearly closes it, allowing the passage of only just enough gas to keep the burners alight; but at eight o'clock, when the weight *l* drops, it raises the handle *o* and quite opens the cock *p*, by which the dial is instantly illuminated.

Thus fig. 3 represents the lever *l* down, and the pins nearly beginning to raise it; by removing two pins, one at each end, the clock will open the gas-cock one hour sooner, and nearly close it one hour later. By successively removing the pins as the days shorten, and replacing them as the days lengthen, the clock is accommodated to all seasons.

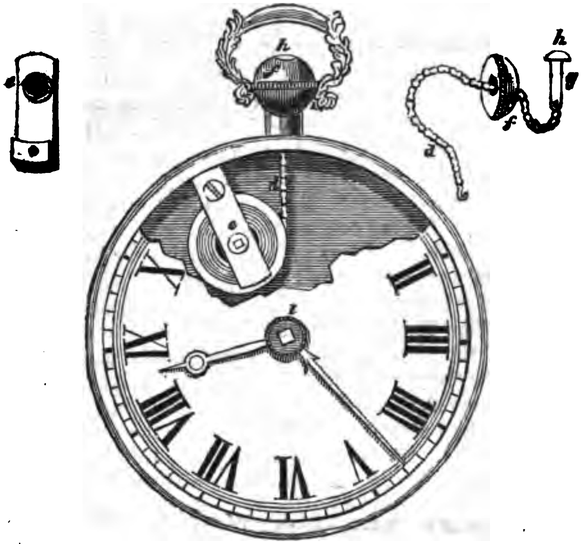
The whole space is kept clear between the lights and the dial, except only the axis *e*, fig. 2; and the lights being placed on each side of this, and having a large reflector, no shadow is perceived from it.

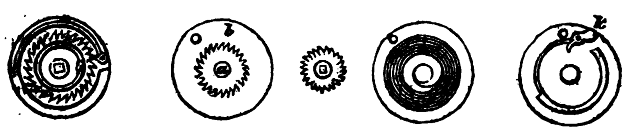
PATENT KEYLESS WATCH OR CLOCK,

By J. A. Berrollas, of Nelson Street, City Road.—*Enrolled Feb.* 1828.

Of late years the ingenuity of watch-makers has been much exercised in the winding up of watches without the employment of detached keys; but from the apparent impracticability of applying such an improvement to watches having *fusees*, their efforts have been solely directed to the winding up of those having *going-barrels*, and various contrivances have been proposed and adapted to the latter for that purpose. There is however, we understand, a considerable degree of prejudice existing among the majority of watch makers, in favour of fusee movements; in consequence of which, the ingenious Mr. Berrollas was induced to study the subject well, with the view of ascertaining the truth of the assumed impracticability of winding up these also without keys, and we are happy to state that he has succeeded in effecting this operation by means the most simple and convenient. Of this fact we can speak confidently, *having made the original drawings of the several parts which composed the movement for the patentee, and assisted him in the specification for enrolment.* The following verbatim extracts from the specification, together with the annexed engraved figures, will give the reader a full insight into the arrangement and the mode of constructing this useful improvement.

"The first mover, or power, in most horological works, is obtained either by the action of a weight or spring. In pocket watches the power is obtained by a a spring called the main spring, which is enclosed in a box called the barrel. Now there are two distinct ways of applying the power of this main spring to the first wheel of a watch; one of them consists in the intervention or agency of a fusee, which is put upon the first wheel; in the other, the first wheel is put upon the barrel itself that contains the spring, which arrangement is





distinguished from that having a fusee by the term 'going barrel.' Watches having going-barrels, are wound up by turning round the barrel arbors: and watches having fusees, by the fusee arbors.

"My invention consists in a new mechanical arrangement applicable to the winding up of horological works. First, as respects what is termed a going barrel, the following are the contrivances that I have invented as applicable thereto:—

"Figure 1 represents a watch with a going barrel, to which my invention is applied; in which figure a part of the dial-plate is represented as broken away for showing the novel parts, the operation of which will be understood by first describing the separate figures, 2, 3, 4, 5, 6, 7, 8, all the same letters of reference in which refer to similar parts. Figure 2 is the barrel ratchet with its click and spring, which keeps the maintaining power up: this ratchet is put on the barrel arbor, which is squared, and the plate is sunk in which it lays; it is on the side of that part of the plate under the dial; this barrel ratchet is sunk or turned out, as far as the teeth, to receive another ratchet with its click and spring, shown at *a*, fig. 3, which I call the recoiling ratchet. This recoiling ratchet is fastened on to the barrel pulley 6; the upper side of this barrel pulley is sunk to receive a spring shown in figures 1 and 5, which is the recoiling spring; on

the edge of the barrel pulley there is a groove to receive a chain *d*, shown at figs. 1 and 8, which is hooked on a pin in the said groove. Fig. 7 gives a perspective view of the stud which keeps the barrel pulley steady and close to the barrel ratchet; the centre of this stud is round, and the centre of the recoiling spring is hooked on; the other end of the recoiling spring is hooked on the barrel pulley. Figs. 1 and 8 show the impendent, made of the same metal as the case; it turns freely on a piece of steel *g*, fig. 8: this steel arbor has a small knob on one end *h*, shown at figs. 1 and 8, to prevent the impendent from slipping off; on the other end it is split to receive the end of the chain, which is pinned on; the pendent of the case is perforated, through which the chain passes. I shall next describe the manner it is to operate, and how it is to be put on the winding-up arbor. When the barrel ratchet before-mentioned is put on the square arbor, the recoiling spring is put on the barrel pulley, and placed over the barrel ratchet, so as to act in its click; the chain, which is not longer than to produce one revolution of the pulley, is put through the pendent and hooked on to the pulley: the stud is then hooked on to the recoiling spring; by this stud the recoiling spring is set up one turn, more or less, and the stud is screwed on the plate. To wind up the watch, the impendent is drawn from the pendent as far as the chain will permit it; the recoiling spring will bring the impendent back again to the pendent; and this operation is repeated, till the impendent remains on the pendent, and cannot be more drawn from it, which indicates that the main spring is wound up.

"When the works are to be wound up by a fusee arbor, the ratchet which keeps up the maintaining power is on the fusee itself; the fusee arbor, squared, is on the same side of the plate as the going barrel under the dial. The recoiling ratchet, fig. 4, is put on the fusee arbor; its click and spring are on the barrel pulley, fig. 6. Here it is to be observed, that when any works are to be wound up by a fusee, the fusee, with the first wheel and its arbor, returns back again, which is not the case with a going barrel. *k* is the relieving click, which has a double action: first, it acts as the recoiling click, by its action in the ratchet; secondly, it acts as a reliever of the said click; it is planted on the under side of the barrel pulley, fig. 6, with its spring, and must be made in the form shown in the drawing. That part which is near the edge of the barrel pulley has a small pin, which pin goes through an aperture of the barrel pulley into the groove where the chain lies. When the works are wound up, the impendent rests upon the pendent, and the chain lays round the pulley, which is the same as with the going barrel. The pin of the relieving click, which goes into the groove of the barrel pulley, receives a pressure from the chain; it brings the click part out of the ratchet, and gives free action to the ratchet on the fusee arbor, to return back again without any drag or incumbrance of the click. *l*, fig. 1, is the finger touch: it is made of gold, or some metal which will not rust. By referring to the drawing, it will be seen that it is a kind of cup with a milled edge, and the minute hand is fastened to it: when the hands

are to be set, a slight pressure with the end of the fore-finger is required to turn the hands. In case it is desired to have a watch or clock wound up in one pull, the multiplying of the turns of the chain round the barrel pulley will have that effect.

"The foregoing account is a full description of the general principles of my invention, applicable to pocket watches; the only alteration it will require for clocks, is in the chain and the impendent, which must depend on the clock case."

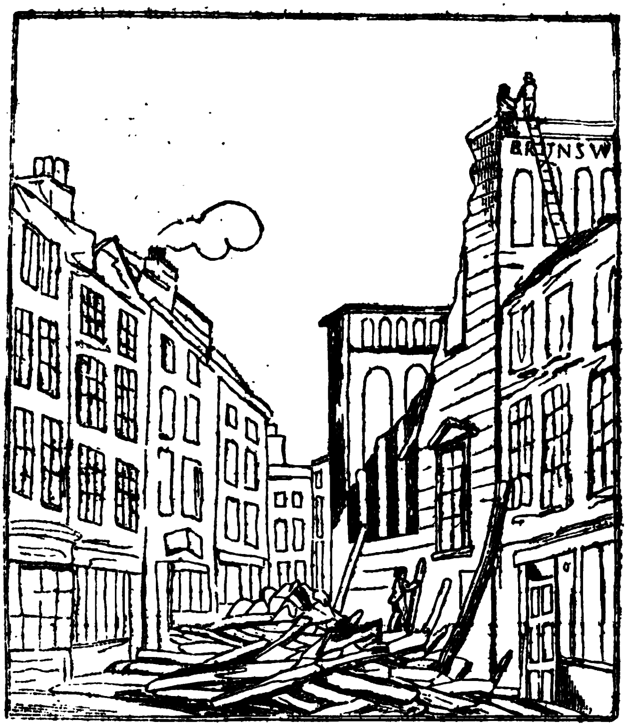
"The points upon which I ground my right of exclusive privilege to the above inventions and improvements under my aforesaid hereinbefore in part recited patent, are the new combination of mechanism which I have produced in the simple, easy, and convenient way of winding up or setting the hands of horological works or movements, by the combined operation of the recoiling ratchet, its click and spring, the recoiling spring, the barrel pulley, the relieving click, the stud, the impendent with its chain, and the finger touch. But I hereby distinctly disclaim any exclusive right, benefit, or advantage, to the individual parts hereinbefore described, which I claim only in their combined and collective capacity; my present patent being for a new mechanical arrangement and combination of parts already well known, but now applied by me to the production of a new purpose and effect."

DESTRUCTION OF THE BRUNSWICK THEATRE:

With some Observations on the Causes of it.

Although this work is not a proper vehicle for the detail of accidents generally, the present calamitous occurrence forms, we think, an exception to that rule; accordingly, we think it necessary to annex such a brief account of it as will, we trust, be at least acceptable to our country and foreign subscribers.

The building of the Brunswick Theatre was commenced but little more than six months ago, and was scarcely finished when it was opened on Monday week last, the 25th of February, for the reception of the public, when 3,000 persons attended: three days afterwards, while the actors were rehearsing their parts previous to that evening's (Thursday) performance, *the roof burst asunder*, and the whole fell in one tremendous crash upon the heads of all beneath, and carrying with its fall the workmen above; one of the side walls, 117 feet long, and 80 feet high, was forced into the adjoining street, partially destroying several houses on the opposite side of the way, and killing one man and two horses. Of nearly 40 persons injured or crushed to death by the fall within the walls of the theatre, 13 or 14 are now dead, and of the remainder, who are chiefly at the London Hospital, several are not expected to survive. The state of some of the poor creatures destroyed was most appalling, as may easily be conceived. The event has excited the deepest sympathy for the sufferers and their families, and a liberal subscription has been commenced for their relief.



On the Monday night previous to the calamity, it appears that what are called the "Flies," viz. the horizontal plates of wood, in the grooves of which the flat or back scenes are shifted, began to settle downwards. They at that time pressed so heavily on the flats, that these latter stuck fast in the grooves, and were moved with great difficulty, and some of the flats were bent to a considerable extent. As the roof of the building is of metal, and the flats are attached to, and depending from, and supported by the roof, the settling of the flats had excited the attention of some of the performers: but on the subject being mentioned to Mr. Stedman Whitwell, the architect, he replied (it is said) there was nothing in it which ought to cause any apprehension; as such a consequence might be expected from the freshness of the building. On Tuesday morning the flats or scenes were freed from this pressure, by bearing up the flies with chains, which were attached to the roof; but on Tuesday evening they again became stiff. This circumstance, which now appears clearly to have been the result of the partial descent of the metal roof, by the bending of the walls, was then considered as a part of the necessary imperfection of a new building.

From the recent examination of witnesses at the Coroner's Inquest, it, however, appears that other symptoms of danger had been

manifested; and that the workmen themselves were not without apprehensions for the stability of the building; and one of the witnesses stated, that these alarming circumstances were studiously kept from the performers.

We should have thought that no man of experience, or of common understanding, acquainted with the *proportions* of the building, and the hurried manner in which it was executed, in all weathers, without allowing the mortar sufficient time to harden, could have come to any other conclusion, but that of the total insecurity of the building.

To attempt the construction of walls, 88 feet high, and 117 feet in length, unsupported by transverse ties, and, for the most part, only 2½ bricks in thickness, was of itself a most hazardous experiment. The *boldness* of the architect, (we do not call his talents into question,) must have been seconded by a very skilful builder, and no less clever and courageous workmen, or such walls could never have been raised to the height they were. Upon making this remark to a person residing in the neighbourhood of the theatre, he informed us, that during the building of the walls, the vibrations of them and the scaffolding were so great, that the men could not proceed in their work, in consequence of which, temporary tie-beams were thrown from wall to wall, across the building, to keep them *steady*. These ties, on the laying on of the roof, were sawn away, leaving a perfectly clear parallelogram, 117 feet by 62 feet.

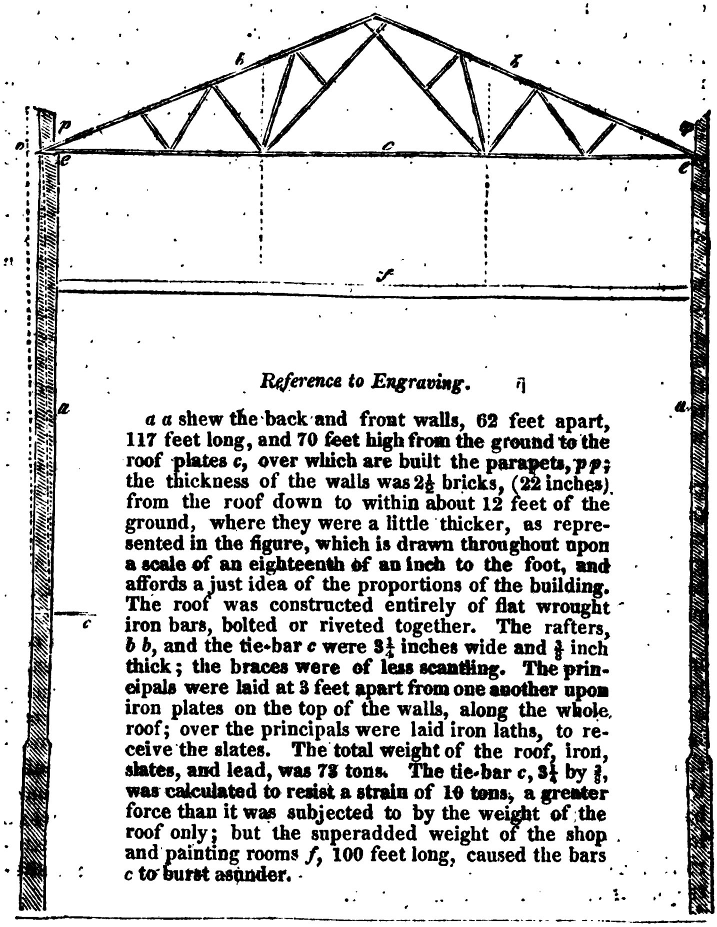
It should be observed, that the boxes and galleries of the theatre were supported from the ground, and had no dependance upon the external walls or parallelogram just mentioned; and it seems to be generally admitted, that the architect did not intend, that the walls of the building should be loaded with anything but the roof, and that the roof should have nothing to support but itself. This is asserted to have been the architect's plan; it has not been contradicted; we may therefore assume it as a fact.

It further appears, by the concurring testimony of several respectable individuals, that in spite of the repeated remonstrances and protests, on the parts of the architect and the roof contractor, the carpenters were directed to suspend a large floor, extending over a great portion of the theatre, together with the floors over the stage, to the roof of the building, the strength of which roof had been purposely adapted to sustain only its own weight.

The newspapers have generally stated, that the roof was of *cast* iron, and of so great a weight, that it crushed the walls of the theatre by its load. Such statement, it is now well known, was perfectly erroneous: the roof was constructed entirely of wrought iron; and instead of being too heavy, was much too light, as it has unquestionably proved by bursting asunder. Had the tie-bars been double the thickness of those employed, *that* occurrence would not have happened; the theatre would probably have stood a little while longer, and have given such general indications of its failure exteriorly, as to have prevented the occurrence of so dreadful a catastrophe as that which has happened.

The introduction of *iron* roofs has been generally censured by the periodical press; such censure has its origin in prejudice, and deficient information on the subject. A roof of wrought iron, properly constructed, possesses greater strength and lightness than one of wood. A judicious combination of cast iron, wrought iron, and wood, we should, however, give the preference to.

It is a prevailing notion that the accident originated in the expansion of the iron by the heat from the gas-lights and fires in the Theatre, thrusting the upper part of the walls outward from the perpendicular, which were not drawn back by the subsequent contraction of the metal, under a reduced temperature, but left in their inclined position; the next increase of temperature repeated the operation of pushing out the walls still further, until the roof was left unsupported,



Reference to Engraving.

a a shew the back and front walls, 62 feet apart, 117 feet long, and 70 feet high from the ground to the roof plates *c*, over which are built the parapets, *p p*; the thickness of the walls was $2\frac{1}{2}$ bricks, (22 inches) from the roof down to within about 12 feet of the ground, where they were a little thicker, as represented in the figure, which is drawn throughout upon a scale of an eighteenth of an inch to the foot, and affords a just idea of the proportions of the building. The roof was constructed entirely of flat wrought iron bars, bolted or riveted together. The rafters, *b b*, and the tie-bar *c* were $3\frac{1}{4}$ inches wide and $\frac{3}{8}$ inch thick; the braces were of less scantling. The principals were laid at 3 feet apart from one another upon iron plates on the top of the walls, along the whole roof; over the principals were laid iron laths, to receive the slates. The total weight of the roof, iron, slates, and lead, was 73 tons. The tie-bar *c*, $3\frac{1}{4}$ by $\frac{3}{8}$, was calculated to resist a strain of 10 tons, a greater force than it was subjected to by the weight of the roof only; but the superadded weight of the shop and painting rooms *f*, 100 feet long, caused the bars *c* to burst asunder.

and it fell. Although this is an ingenious way of accounting for the disaster, there is no necessity to resort to it, as there are established facts to which the cause may be more reasonably attributed.

The insufficient strength of the roof to sustain the additional weight suspended to it, we believe to have been the proximate cause of the accident. The annexed diagram, which exhibits a vertical section of the roof and the walls of the theatre, will tend to explain this circumstance.

The dotted right-angle *o o* in the diagram, is intended to shew the great insecurity of building such lofty and extensive walls, of so little thickness. It should be considered that bricks, however good, are not perfect cubes; and to compensate for this irregularity, and to cement the bricks together, a layer of mortar is laid between them; and in a wall of 70 feet high, there are about 280 of these layers of mortar. Now if any one of these give way, so as to incline the sixteenth of an inch, at 60 feet from the top of the building, the upper end of the wall is thereby thrown out 15 inches, which is about the surface of wall covered by the roof of the Brunswick Theatre. The consequence of building such walls is so obvious, that we cannot understand how an architect could venture upon it. We question much if there is an *engineer* in the kingdom, (we know but little of architects,) who would venture to build a wall 80 feet high, without ties, of less than double the thickness of those of the Brunswick Theatre. The walls of Covent Garden Theatre were double that thickness, although constructed with a view to true economy.

Unfortunately, the construction of this theatre was undertaken with a capital inadequate to its completion; to lessen the outlay of money in every possible way, the building was constructed fearfully light and frail, and the work was constantly carried forward in the most hurried manner, to expedite the time of opening it to the public.

The cut at page 8 is a fac-simile of a sketch sent to us by a correspondent, which will convey to our country friends an idea of the situation and nature of the catastrophe.

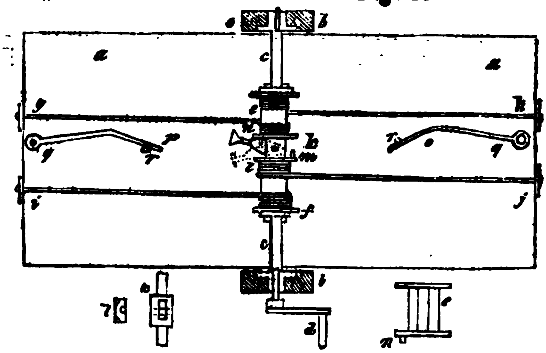
IMPROVED MANGLE,

By Mr. Jonas Thurrel, 2, Little King Street, Camden Town.

This is a new and very simple method of producing the alternate motion of a mangle box, by the continuous movement of the handle in the same direction.

Reference to the Figures.—*a a* is the mangle box; *b b* parts of the frame which support the axis *c c*; *d* the cranked handle; *e* and *f* two barrels loose on the axis *c c*; to the barrel *e* are fastened two cords, one of which after making several coils round the barrel, passes from its *under* side to the eye *h*, where it is secured; while the other, after having in like manner coiled round the barrel, is also delivered from its under side to the eye *g*. To the barrel *f* are also fastened two cords, which being delivered from the *upper* side of the

Fig. 1.



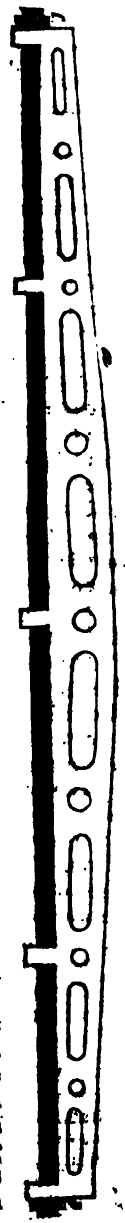
barrel, are respectively fixed in the eyes *i* and *j*. The part *k* of the axis between the barrels is made square, and is cut out longitudinally, to receive the lever *l*, which is secured in its place by a pin, but so as to allow of lateral motion between the two barrels; each of these barrels has a stud *m* and *n* so placed that the lever may be shifted to engage either of them, and, consequently, to oblige that barrel with which it may be engaged to revolve together with the axis; *o* and *p* are two alternating irons, each with an eye at one end, through which a pin *q* passes, in order to fasten them to the mangle box; their height above the box is such as to allow them just to clear the axis when passing under it, and the motion of each is limited, but on opposite sides, by the adjusting pins *r r*.

The figure represents the lever *l* as engaged with the stud *n*, and, consequently, as being fixed in the barrel *e*; now if the barrel is turned so as to wind up the cord *h*, the cord *g* will proportionally unwind, and the mangle box will move from left to right, till the end *l* of the lever comes in contact with the alternating iron at the point *o*. By continuing to turn the handle, the end of the lever slides from *o* to the end of the iron, and is brought into the position, shown by dotted lines; the stud *n* is consequently disengaged, and the barrel *e* becomes loose; at the same time the lever engages the stud *m*, and fixes the barrel *f*. The handle being still turned in the same direction as at first, begins to wind up the cord *i*, and thus makes the box begin to move from right to left, the cord *j* at the same time unwinding proportionally. When the left hand alternating iron has begun to come under the axle, the end of the lever will touch it at *p*, will slide along it to the point of the angle, and in so doing will bring it to the position shown in the figure, the barrel *e* being now fixed, and the barrel *f* being loose. Thus is accomplished the production of an alternating motion of the box, by continuing to turn the handle always in the same direction.

The back of the lever *l* is bevilled off, so that if the handle is turned in a wrong direction, it passes between the studs *m* and *n*, and not engaging either barrel produces no motion of the mangle box.

Fig. 2 is one of the barrels separated; and fig. 3 the square middle part of the axis, showing the slit in which the lever traverses.

The sum of Five Guineas was presented to Mr. Thurrel, by the Society of Arts for this invention, a model of which may be seen in the Society's Repository.
Trans. Soc. Arts.



IMPROVED METHOD OF PREPARING LIME-JUICE.

By Capt. Wm. Bagnold, of Falmouth.

It is considered that the anti-scorbutic qualities of lime juice are greatly deteriorated by the usual method of preserving it in 25 per cent. of rum. A method of preserving the juice, without the addition of spirit, was proposed by Captain Bagnold about two years ago, an account of which appeared in the Register of Arts, (first series.) Since that period Capt. B. has simplified the process, which is as follows :—

The expressed juice, being well strained to separate every part of pulp and rind, is to be boiled in an earthen vessel smartly for half an hour; a part of the water is driven off, and the vegetable albumen will separate, and subside on cooling; decant the juice clean, and re-boil it for a few minutes; fill it into bottles, previously dried and heated, so as to have just room enough for the cork; cork tight, cement over the cork, and lay the bottles away on their sides. This method appears to be efficacious in preserving the juice without the alcohol, and leaves it in possession of all its flavour and anti-scorbutic qualities.—*Trans. Soc. Arts.*

IRON GIRDERS

Employed at the London University.

The annexed cut represents one of the excellent iron girders, employed in the building of the London University, now erecting, which has been furnished to us by a gentleman residing on the spot. The whole length is 36 feet, and cast in one piece; it rises in the middle about 25 inches, and is provided with a *wrought* iron tie, or circular bolt, about 3 inches diameter, which passes through apertures in the series of projecting pieces shewn, and is strongly screwed up at the ends *c c*. On each side of this girder are bolted wooden scantlings, into which the joists are framed.

OPENING OF THE NEW LONG ROOM AT THE CUSTOM HOUSE.

This room was opened for public business on Monday, the 3rd of March, for the first time since its completion.—It is now three years since the foundation of the eastern part of the building gave way. Mr. Smirke, the architect to the present work, has had a most difficult task to perform in renewing the foundation, without pulling down the western part of the edifice; and, in fact, the foundation of the whole building has been rendered perfect by this eminent architect. In order to effect the object, the building was shored up, and was, in fact, suspended on the shores. The great difficulty to be overcome was that of giving uniform support to every part of the walls, otherwise they would have bulged out. This support, however, was given by a piece of carpentry of no ordinary skill. Stout planks were placed perpendicularly against the walls, six or eight feet apart, and connected together with beams fitted into a strong framing, some distance from the building. An excavation was then made in order to lay bare the foundations, a new foundation was laid and built up to the original walls, with every prospect of duration. The long room, as it now stands, is wholly new; the walls being made close to those of the old, at least such as remained firm. The room is 186 feet 5 inches long, and 60 feet wide. The roof is gothic, supported by plain square pillars at the sides.—In lieu of stone, the room is floored with oak.

The stone work, it will be recollected, in the original room was one of the causes of the building sinking, the weight being so great. The room is warmed by a current of air rising through shafts, which rise up through the building, and escapes out of two circular frames placed in the centre of the room. The Custom-House Agents have a room appropriated to them attached to the long room, which greatly facilitates business.

The whole character of the room is a combination of neatness and aptitude for the despatch of business. Beneath the long room is the king's warehouse, roofed with iron, and supported on iron pillars. The long room is approached by two noble staircases, composed of stone. The room is exceedingly well lighted, as, besides the windows on the first story, light is admitted by nine windows on each side of the roof, having ground glass in them.

LONDON MECHANICS' INSTITUTION.

MR. BROWN'S INTRODUCTORY LECTURE ON HISTORY.

Mr. Brown commenced by congratulating the Members of the Institution on the progressive advance of knowledge, and establishment of scientific institutions for the farther diffusion of improvement. He alluded to the various subjects introduced to them at lectures, and stated that, with the exception of those of Dr. Mitchell, no lectures on that important and interesting branch of knowledge, History, had been delivered, and therefore considered that a few evenings devoted to that subject could not be misapplied. After a few observations on the divisions of history and the times occupied in

those divisions, Mr. Brown eulogised the universal history, and said we had reason to congratulate ourselves on historical records impartially collated from various sources. Historical truth was indeed difficult to obtain, but where relations of facts by different nations or persons having different feelings to gratify, or being under the influence of dissimilar religions, were found to coincide there was every evidence of truth. This was the case in the historical records of the Jews, which were corroborated by the testimonies of the Greek and other writers, whose religion was different, and who would be unwilling to do them justice. The Mosaic account of the Flood was corroborated by the discoveries of geologists in every quarter of the globe, though we have no information in Scripture as to the situation of land and water in the antediluvian world. But although not certain of the precise situations of land and water, we are acquainted with the spot where our first parent was created. The descendants of Noah emigrated to Babylon, and 100 years afterwards emigrated to other parts. The remainder of Mr. Brown's introductory lecture consisted in an explanation of a very ingenious historical chart; in which the different nations were represented in colours characteristic of them. Egypt, on account of its fertility, was represented by a green colour, as was also the Mahommedan empire green, being the favourite colour of its prophet and followers.

Our report of the proceedings of this and the other Scientific Institutions, having come to us late, we are obliged to defer its insertion until our next.

MISCELLANEOUS INTELLIGENCE.

Nutriment from Woody Fibre.—It appears from the valuable researches which Dr. Prout is now pursuing in his "Analysis of Organic Substances," that the ligneous fibre of plants is capable of becoming a substitute for grain for human food, in periods of scarcity, by undergoing the following process:—A given quantity of woody fibre, in shreds or shavings, being well macerated in boiling water, in order to deprive it of the resinous and extractive matter, is to be well ground or reduced to an impalpable powder, having the appearance of brown flour or meal; with a certain portion of leaven this flour may be fermented and formed into a tenacious paste; and when well baked is not inferior in quality to ordinary wheaten bread from undressed meal. A tolerable good variety of starch may also be obtained by boiling wood flour in water, till the liquid acquires the form of jelly when cooled. In fact, this gelatinous substance, *vi fecula*, constitutes the nutritive qualities of the preparations of all vegetable substances for human food.

Water Works of the Ancient Romans.—It is an erroneous, but at the same time a prevailing opinion, that the ancient Romans were unacquainted with some of the simplest laws of the motion and pressure of water. This is, however, unfounded, as Pliny informs us, as a general principle, viz. that water conducted in pipes or tubes, will always rise to the same height with the fountain from which it flows. The water was conducted by the Romans into their buildings, either by channels constructed of masonry, or by means of wooden pipes, or even of earthen ware; and allowed a descent of one foot in sixty for the flow of water, which was admitted into a reservoir,

divided into three equal compartments, after it had been brought within the walls of the city; one to supply the pools and fountains, a second for the baths, and a third for the palaces and private houses. The pipes used by them were of lead, about 10 feet long, $7\frac{1}{2}$ inches in the bore, and $\frac{1}{4}$ of an inch thick. They were, however, averse to the use of leaden pipes, knowing them to be of an unwholesome nature. They were made of thin plates of lead, bent in the form of a cylinder, and soldered at the edges: casting, as practised at present, was unknown. The supply of water was regulated by the dimensions of the spouts; these were of twenty-five descriptions. The standard spout seems to have been about $\frac{6}{10}$ths of an inch in the bore, and its length about 8 inches and $\frac{7}{10}$ths; and, if that was also the height of the column of water, 1·970 cubit feet would be discharged in the space of twenty-four hours. Specimens of Roman leaden pipes are preserved in the Museum of Natural Philosophy of the University of Edinburgh.—*Edin. New Phil. Jour.*

Preservation of Fresh Water Fish in Winter.—When fish-ponds are frozen over, it should be the daily practice, for the preservation of the fish, to break the ice in several places, and agitate the water beneath, in order to renew the supply of atmospheric air. If, as in many fish-preserves, a penstock will allow of the water being partially drawn off from beneath the ice, it will materially aid in the preservation of the fish. The necessity of a supply of atmospheric air may be easily proved, by confining a few small fish in a glass vessel nearly filled with water, and tied over with a piece of bladder; the fish will, in consequence, soon grow languid and die, and the air above the water will be found to extinguish a lighted taper, owing to its being deprived of its oxygen.

Colour of the Red Sea.—The colour of the Red Sea has given rise to various investigations. Dr. Ehrenburg, who accompanied Dr. Hemprich, ascertained that it was caused by a species of Oscillatoria, one of those small plants which are intermediate between animals and plants.

LIST OF NEW PATENTS SEALED.

LANCETS.—To William Weiss, Strand, London, for an improved instrument for bleeding horses. To be enrolled by 26th July.

PRINTING.—To Augustus Applegath, of Crayford, Kent, for improvements in block printing. To be enrolled by 26th May.

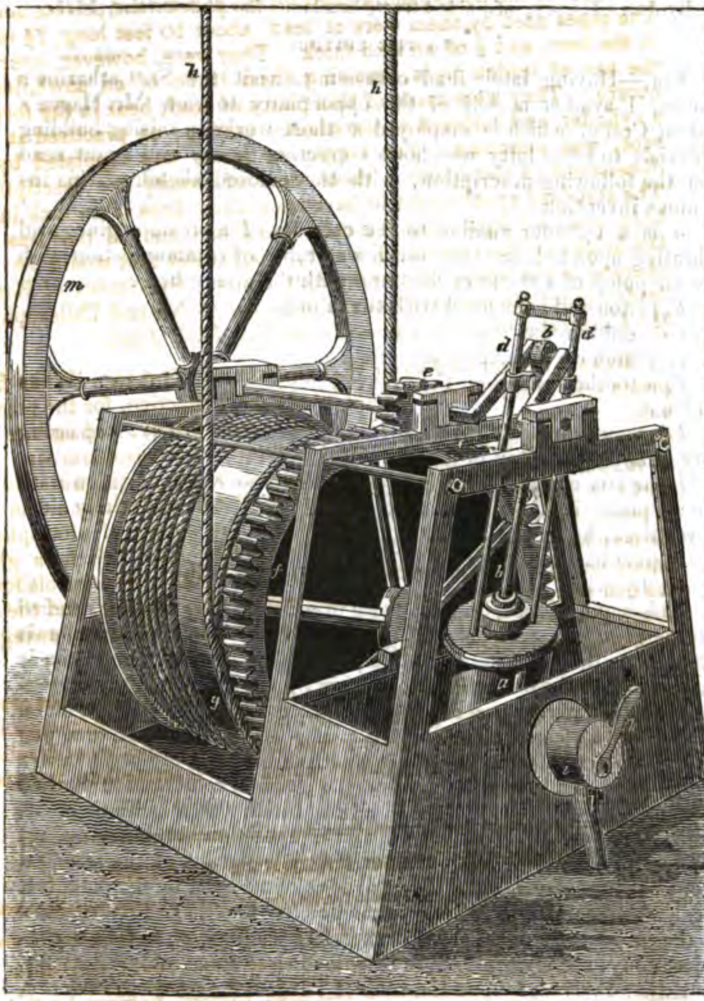
PRESERVING FOOD.—To Donald Currie, of Regent Street, London, for a method of preserving vegetable and animal substances, and liquids. To be enrolled by 31st July.

PROPELLING.—To William Nairne, of Dane Street, Edinburgh, for improved methods of propelling vessels. To be enrolled by 5th August.

TO OUR READERS AND CORRESPONDENTS.

The communication on the uses of Steatite is not original, the substance of it has already appeared in the Register.

Aquarius's Pump will raise no water without he reverses the position of the valves, and very little afterwards.



HAGUE'S PATENT PNEUMATIC CRANE,

EMPLOYED AT THE NEW ST. KATHERINE'S DOCKS.

PATENT PNEUMATIC CRANE.

By John Hague, of Cable Street, London.—*Enrolled October*, 1827.

TO THE EDITOR.

Sir,—Having lately had occasion to visit the St. Catharine's Docks, I availed myself of the opportunity to view Mr. Hague's Patent Crane, which is employed at those works in raising building materials to some lofty warehouses erecting there; and I now send you the following description, with the inclosed sketch of this ingenious invention.

a is a cylinder similar to the cylinder of a steam engine, and vibrating upon hollow arms, serving as tubes of communication with the air pump of a steam engine, and with the atmosphere.

b, piston rod connected with the crank.

d d, guide rods.

e, pinion on the axis of the crank.

f, a toothed wheel on the axis of the drum *g*, and driven by the pinion *e*.

h h, ropes for raising the loads coiled round the drum, and passing over pulleys at the top of the building.

i, the box containing the valve, by which the communication with the air pump is either opened or shut off, and the motion reversed, as required, by means of the spanner *k*.

l, pipe leading to the air pump.

m, fly wheel.

This engine acts upon pneumatic principles, the air being rarefied alternately above and below the piston, while the opposite side is exposed to the atmosphere; a reciprocating motion of the piston is thus produced in the cylinder, causing by the intervening agency of the crank and pinion, the revolution of the drum. The machine being worked by a steam engine, which is also employed to drive a pug mill, I am unable to institute a comparison between the performance of this crane, and that of cranes on the common construction worked by men. I was, however, much pleased with the steadiness of its action, and the facility with which the operations of lowering, reversing the motion, &c. were performed by means of the spanner. Not knowing what are the advantages contemplated by the patentee, I cannot of course form an opinion how far they have been realized in the present instance; I shall therefore confine myself to a consideration of the principle of the machine in question; only observing, that what I advance upon the subject is with the utmost diffidence, and that I shall be happy if I should induce any of your readers, more competent than myself, to give an opinion of the merits of the invention, and at the same time correct any errors I may fall into in my observations.

In regard to the power required to produce a given effect, I feel great difficulty in coming to any conclusion; but I shall endeavour to state the question in its simplest form for the consideration of your readers. Let us suppose a cylinder 20 feet long connected at top with an air pump, and the lower end closed by a heavy piston, which

may represent a load to be raised. Let the air pump be equal to $\frac{1}{20}$th of the cubic contents of the cylinder, and let it be necessary to make 10 strokes of the air pump to produce a rarefaction of the air in the cylinder, capable of overcoming the gravitating power of the piston, it will then require 20 more strokes of the air pump to raise the piston to the top of the cylinder; the power will therefore move through 30 feet, whilst the load moves through 20 feet, and if the force requisite at each stroke be equal to the load on the piston of the air pump, there is evidently a great loss of power. But it appears to me that if a double-barrelled air pump be employed, the force required to make a stroke of the pump, will not be the whole amount of the pressure on the ascending piston; but merely the difference between the pressure upon the ascending piston and that upon the descending one. At the beginning of a stroke this difference is 0, but at the end of the stroke it amounts to the whole difference between the atmospheric pressure upon the piston, and that of the rarefied air beneath it. The question, therefore is, whether the power thus saved, be equal to that expended, in producing the requisite degree of rarefaction. But even should the principle involve a loss of power, it may, perhaps, be found economical in docks and warehouses, where numerous cranes are employed, and at considerable distances asunder. Cranes in these situations have hitherto been worked by men—the dearest species of force: and if steam can be substituted, although not applied in the most advantageous manner, a great economy must result. But to employ a separate engine to each crane would be very expensive, as engines of small power would be required, which cost more in the first instance, and consume more fuel in proportion, than larger ones; and if only one large engine be employed the connexion with the more distant cranes would be difficult and expensive; the load also would be continually varying according to the number of cranes in operation. In either mode the engine would be working at a disadvantage, from being frequently stopped when the cranes were not working. Instead, therefore, of the direct application of the steam engine to raise the load in either of the above-mentioned modes, it would be preferable to employ an engine of moderate dimensions in such a way, that it might continue working with few interruptions, and with a uniform, or nearly uniform load, storing up power to be expended as occasion required.

This may be effected in various ways; but I shall confine myself to the one adopted by Mr. Hague, which is said to be as follows:—*An engine is to be kept at work to maintain a great degree of rarefaction in a number of large air vessels, these air vessels communicate by pipes with the different cranes, of the construction just described.* From this it will be seen, that the load upon the steam engine is always constant, or nearly so, and that the number of cranes at work will make no difference in this respect, but they will move more slowly.

A peculiarity attending cranes on this construction is, that the work performed is in some degree proportional to the power employed; or, that the power being constant, the velocity of the load will be

inversely as its weight, without any alteration of the arrangement of the machinery.

The principal difficulties that occur to me is in the case of several cranes being at work at one time, with loads requiring different degrees of rarefaction under the pistons in the cylinders; but as the patentee is about to erect a second crane, I shall endeavour to learn how far this is a practical objection, and the means taken to obviate it.

J. M.

PATENT SHIPS, WITH WATER-TIGHT AIR CHAMBERS,

By Hugh Evans, of Holyhead.—*Enrolled April*, 1827.

The patentee proposes to construct in the holds of ships, from end to end, an additional deck, in the situation of the *orlop*, which deck is to be made an air and water-tight chamber, and of course must be strongly constructed, and well caulked, to prevent the liability to rupture, and the influx of water. The upper and under surfaces of this deck are to be convex, connected by strong bolts passing through them. By this contrivance and some others, the details of which we hope shortly to lay before our readers, the patentee expects to be able to construct vessels, that it will be almost impossible to sink.

PATENT STEAM ENGINE BOILER,

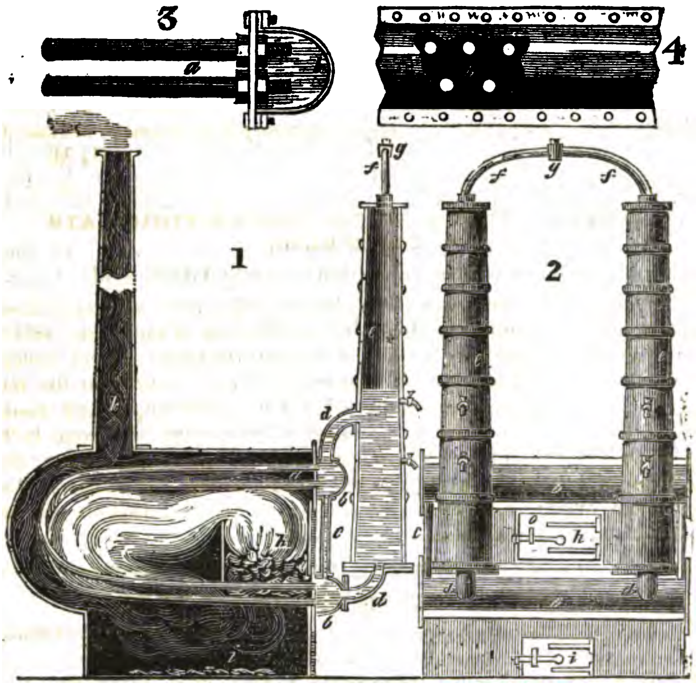
By Goldsworthy Gurney, Esq. of Argyle Street, London.—*Enrolled April*, 1826.

In the description of Mr. Gurney's steam carriage, at page 261, of our last volume, we gave a slight account of his patent boiler; and at page 292, in the description of Mr. Gordon's steam carriage, we again alluded to it, with a promise of giving a description of it, which has not yet been done intelligibly by any of our contemporaries.

The enrolled specification of the patentee, embraces several modifications of the apparatus, which vary so much from that before us, as scarcely to be recognised as belonging to the same invention: nevertheless, they are such as reflect great credit upon the talents and ingenuity of the contriver. Two years' experience in the construction and use of his steam apparatus, has led Mr. Gurney to abandon one part, and alter another, till it now presents itself in the form represented in the annexed diagrams.

Fig. 1 shews a vertical section of the boiler. Fig. 2, an external end view of the same. Fig. 3, the manner in which the series of pipes composing the boiler are fixed, and open into the horizontal chambers. Fig. 4, a portion of one of the horizontal chambers, partly broken away, to exhibit the apertures for the pipes, and their arrangement. Similar letters in each figure refer to the same parts.

In the section, fig. 1, the semi-elliptical form in which the pipes are bent, and the manner in which they respectively cross each other, is seen; the ends of these pipes have screw threads on the



outside, to receive nuts, which secure them to the horizontal chambers *b*, as shewn at fig. 3. These chambers have also direct communication with one another by means of the vertical pipes *c*, (figs. 1 and 2.) *d d* are two bent tubes, leading from *b b*, into the "separators" *e e*, which are tapered cylindrical wrought-iron vessels, strengthened by hoops. From 30 to 50 of the pipes *a*, (the number depending upon the size of the apparatus,) are arranged in the manner shewn, (figs. 1 and 4,) in which the fuel is placed as at *h*, the heated air and flames are directed by a bridge *i*, to take the course delineated, before entering the chimney *k*; but a considerable portion of the heat, passes freely between and round about the pipes, the whole being exposed to the powerful effects of a furnace so circumstanced. *o* is the furnace door, and *i* is the ash pit.

During the working of the engine, the separators *e* are, by the usual means, kept supplied with water up to the level shewn, which being higher than the pipes in the furnace, the latter are always kept full of water, a point of essential importance in the opinion of most engineers. The steam generated by the heated pipes in the furnace, is given off in the upper part of the separators, and passing through the pipes *f f*, enters a common pipe *g*, that leads to the engine. Some of Mr. Gurney's boilers have two separators, others only one, dependent upon the size.

The boiler in our diagrams, is represented as being surrounded merely by a single case of iron: to prevent the radiation of heat, it is proposed that it should be made double, with some non-conducting substance between the two cases, as usual. For stationary boilers set in brick-work, the iron casings are of course dispensed with.

To increase the intensity of the fire, the patentee proposes, by some blowing apparatus, to force blasts of air on the *top* of the fuel, instead of in the midst of it, by which means, it is said, the smoke will be consumed.

To obviate a common objection to tubular boilers, of their becoming choked with a deposition of earthy matters, Mr. Gurney proposes to cleanse them out, when they become foul, by the following chemical treatment. If the tubes are of iron, one part of muriatic acid, with 100 parts of water, are to be left in the boiler a sufficient time to dissolve the incrustation; if of copper, dissolve 1 lb. common salt, ½ lb. sulphuric acid, in 4 gallons of water. To expedite the operation of cleansing, a small fire may be made in the boiler, and the steam be employed to blow the contents out of the tubes. To *avoid* incrustations, Mr. G. proposes to use only rain or distilled water.

IMPROVED MEDICINAL EXTRACTS,

By J. HOULTON, Esq. of Lisson Grove, London.

IT is well known to professional men, that the juices of almost all plants are more or less injured in their medicinal qualities, by being boiled down and evaporated in the usual way, to the consistency of extract.

At Apothecaries' Hall, the evaporation is entirely effected by means of steam, so that the heat employed is under complete controul; and in Mr. Barry's patent process, the operation is performed in vacuo.

Mr. Houlton's process is the following. The plant being bruised, is to be submitted to the action of a press, in order to squeeze out the juice, which is then to be strained through fine linen. The depurated juice is now to be poured to the depth of about one-eighth of an inch, into an earthenware plate, or a glass dish, and is to be exposed to a constant current of air, by placing it in the inner sill of a window, and raising the sash about an inch. The constant current of air thus produced, occasions the rapid evaporation of the watery parts, and there remains a soft extract, retaining the colour, odour, and medical properties of the recent plant, with less alteration than by any other method. If the sun shines, a blind should be hung before the window, as vegetable juices are speedily changed by the action of solar light. The consistence given to the extract is entirely optional, but those that are rather hard will keep better than those that are soft.

This method is not adapted to a manufactory on a large scale, but any individual practitioner may, without much trouble or expence, prepare in this way for his own use, extracts far superior

in active properties, to those usually met with. The smell, flavour, and colour, are also preserved by this process, which, requiring not the aid of artificial heat, is extremely easy and economical. Some extracts, prepared in the way described, were forwarded to the Society of Arts, together with a communication of the process, by Mr. Houlton, for which he received their vote of thanks.

Trans. Soc. Arts.

DEFENCE FOR SHIPS & FORTIFICATIONS,

Against Cannon Balls, and causing them to fly back against the Enemy.— By Lewis Gompertz, Esq. of Kennington.

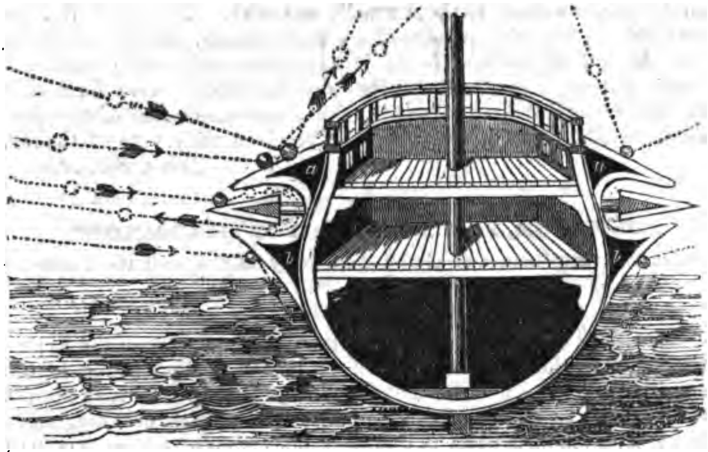
To the Editor.

Sir,—About a year previous to the commencement of the Register of Arts, the above mentioned gentleman communicated to the scientific world, a plan for defending ships and fortifications against the destructive effects of cannon balls, which being original, ingenious, and founded upon philosophical principles, I trust you will consider a short account of it, deserving of a place in your work. The original paper published by Mr. Gompertz on the subject, is, probably, somewhat too lengthy for insertion, I have therefore condensed it to about the same volume, that Mr. Gordon compresses gas in his patent lamp; unlike the lamp, however, I fear I shall only be able to transmit a thirtieth part of the light, instead of the whole.

The chief utility promised by the invention, is in its application to merchant vessels, ships of passage, &c. and for fortifications; but for ships of war, (as it could be adopted by both parties,) its effect would become *neutralized,* though it seems that even in this case, it would save the men from injury, and would always be in favour of the weak and defensive side, its nature being that of defending itself, and returning the blows, but without any power of attacking, unless furnished with guns also.

The annexed figure gives a transverse section of a ship, with its sides constructed with oblique and curved surfaces, so as to cause the balls projected against it to glance off at an angle; which angle, supposing the surfaces of the bodies in collision to be elastic, will be always equal to that formed by the line in which the projectile moves, and that of the surface it strikes; that is to say, according to the well known law, of the angle of reflection being always equal to the angle of incidence. If, therefore, a shot strikes the upper side of the bevilled part *a*, it will be reflected at a similar angle, and be thrown over the vessel; and if it strikes the lower side of *b*, it will be reflected at a similar angle into the water; as shewn by the balls, and the direction of the arrows. But if a ball* strikes against the inclined plane of the triangular formed piece, projecting between *a* and *b*, it will rebound, at nearly equal angles, from side to side, then, taking the curve, it will be returned to the point from whence

* The balls in the engraving are represented too large.—Ed.



it was projected. As the force of the balls thus returned, would be so much diminished, as to have probably little effect upon the enemy, it might be advisable to dispense with the curved part, and make the whole defence consist of one angular projection, presenting two inclined planes only.* The grain of the wood in these projections, should be in the direction of the motion of the ball, and not transverse; and a coating of grease on the external surface, would *assist* in warding off the injurious effect of the shot.

Mr. Gompertz's original paper, now re-published in Jamieson's Dictionary of Science, (vol. i. page 330,) contains an account of the experiments made by him, in proof of these facts, and a very able investigation of the effects of shot, under various circumstances and forms of defence; for all which I must refer your readers to the work in question. The subject appears to me to be particularly worthy of attention, as affording *an excellent defence for the weak, against the assaults of the strong*.

Any person repeating Mr. Gompertz's experiments, should (in order to avoid danger) stand at the side of the gun, at a great distance, and tie a string to the trigger, and of course must not place himself either behind or before it.

A CONSTANT READER.

NEW POCKET THERMOMETER.

The different degrees of expansibility of dissimilar metals by the same increase of temperature is well known, and has been usefully employed to produce compensation in the regulators of time keepers; but it is not so generally known that a very sensible and convenient thermometer may be made on the same principle.

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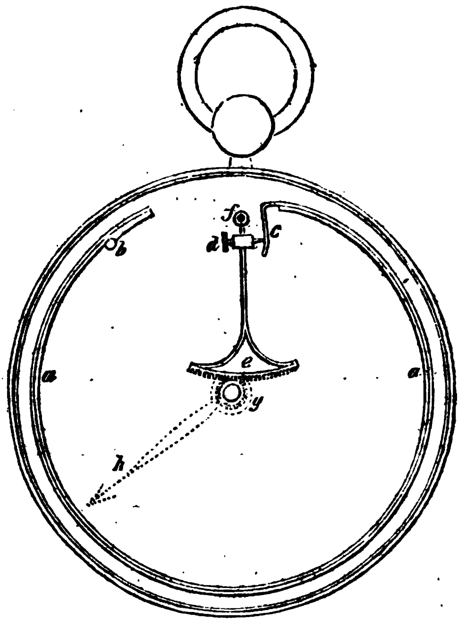
* The space inside the angle might, in this case, be turned to useful account in merchant ships.—Ed.



The one from which we made the accompanying diagram is contained in a common-sized pocket watch, and indicates the temperature from 30° below Zero to 80° *Reaumer,* equal to the extent from Zero to 212° on Fahrenheit's scale.

It consists of a slip of steel on a slip of brass attached together, and bent with the brass inwards into a circular form, *a a,* and fixed to the frame of the watch at *b,* immediately behind the dial. One end of this circular piece is bent inwards at *c,* and acts upon a lever *e f,* of the third order. The lever moves upon a pivot at *f,* is furnished with an adjusting screw *d,* and a toothed segment *e.* The teeth of this segment act upon the teeth of a small pinion *g,* to the projecting pivot of which an index *h* is attached.

The action of this little instrument is obvious; for as the interior portion of the compound circular piece is of brass, which is more expansible than the exterior which is of steel, an increase of heat will cause the ring to open, but in opening it acts upon the lever, and by that means turns the index, which points out by the graduated circle on the face of the watch the quantity of increase. On the contrary, when a decrease of heat takes place, the ring will have a tendency to close, and the lever being kept up to it by a small spring on the opposite side, acts upon the index, and points the quantity of decrease in the temperature.

This Thermometer indicates a change of temperature much quicker than the common mercurial thermometer does, owing to the metals being better conductors of caloric than wood or glass, the substances of which they are usually manufactured.

CHEAP SODA LIQUOR,

FOR THE USE OF DYERS OF TURKEY RED.

By Mr. C. CAMERON, of Glasgow.

As the Turkey-red dyers are the great consumers of the common soda of commerce, it occurred to Mr. Cameron, that they might make their own alkali, by the cheap and simple process of decomposing muriate of soda by pearl-ash, and thus procure a liquor equally pure, without the tedious and expensive operation of bringing the soda to the state of crystal. Having recommended the plan to a Turkey-red dyer at Glasgow, he immediately put it into practice, and it is now being gradually adopted by the trade.

Into a cast-iron boiler, capable of holding 450 gallons of water, are to be put 10 cwt. of pearl-ash (first sort), 7 cwt. of muriate of soda, and four times that weight (of the muriate of soda) of water, applying heat, and stirring until both are dissolved. After boiling some time, the muriate of potash begins to crystallize on the surface. As the boiling is still continued, the muriate of potash is rapidly forming, and is lifted out of the vessel by means of a ladle pierced with small holes, and thrown into a vessel placed in an inclined position, with its end or side a little within the edge of the boiler, which allows any of the liquor that may have been carried over to drain back again into the pot. The boiling is continued until nearly the whole of the muriate of potash is deposited and taken out. The liquid is then removed into another vessel, either of cast iron, or wood lined with lead, and allowed to remain until it has cooled to the temperature of sixty degrees, during which time it parts with the rest of its muriate; it is then run off into another vessel, and diluted with water to twenty degrees specific gravity, more or less at pleasure, which prevents the soda from crystallizing, and gives an uniform strength of liquor, equally pure with the best crystallized soda, and at about half the price. The above weight of pearl-ash and muriate of soda produces a mineral alkali equivalent in quantity to what is contained in one ton of soda of commerce, the best of which does not exceed 22 per cent.

10 cwt. of pearl-ash, first sort, at the present price, £22 per ton, is	14	0	0
7 cwt. of muriate of soda, at 30*s*. per ton is	0	10	6
	14	10	6
These produce 12¼ cwt. of muriate of potash, at £5 10*s*. per ton..	3	8	9
Which leaves	£11	1	9

as the cost of alkali, equivalent to one ton of soda, the present price of which is £22.

The process is so simple, that one workman can decompose one or more tons per day, dependant on the size of his vessels. As the Turkey-red work consumes from 40 to 250 tons annually, according to the extent of its establishment, it is of great importance to that va-

luable manufacture. Mr. Cameron claims no merit in merely decomposing muriate of soda by potash, that is a fact long known; but the Turkey-red dyers are indebted to him for being the first to point out to them a simple and unexpensive method, of making their own alkali, without being at the expense of erecting additional premises, and extensive apparatus, required for the purpose of crystallizing; a common boiler and two or three other vessels being all that is requisite.—*Transactions of the Society of Arts, for* 1827.

SCIENTIFIC INSTITUTIONS.

London Mechanics' Institution.—On Friday, Feb. 22, Mr. R. Wallace delivered a very interesting and instructive Lecture on the *Nature and Utility of Mathematical Science.*

Feb. 27.—Mr. Brown delivered the first of a short Course on *History, &c.*, a report of which see in our last Number, p. 15.

Dr. Birkbeck's Lecture on the *Action of Air and Steam Valves*, which was announced for this evening, has been deferred for a few weeks, till the completion of Mr. Brown's Course.

Feb. 29.—This day Mr. Hemming delivered a very successful and instructive Lecture on *Chemistry*, being the second of his Course, of which the following is a correct report:—

SECOND LECTURE OF MR. HEMMING ON CHEMISTRY.

Mr. Hemming commenced by briefly recapitulating the heads of his former Lecture, and then proceeded with some observations on the causes that modify affinity. He alluded to some apparent contradictions in the stated orders of affinity, which Berthollet fancied he had discovered; and gave Berthollet's account of the decomposition of the sulphate of barytes by potash, which has a less affinity for the acid than barytes. Berthollet conceived that mass or quantity overcame affinity, and that by adding an excess of a substance, having less affinity for one element of a compound, than those elements have for each other, decomposition would ensue. Sir H. Davy's repetition of the experiment was then explained, by which it appeared, that the potash absorbed carbonic acid from the atmosphere, during the process, if conducted in *open* vessels, and that by this Berthollet was deceived; for, when the experiment was performed in *close* vessels, no decomposition ensued.

Mr. Hemming then alluded to the necessity of considering duly the action of light and air; the solubility, cohesion, elasticity, temperature, and state of electricity of substance, uniting chemically, before attempting to explain the phenomena, on general principles. An explanation of the atomic theory was then given, and the exceptions to it pointed out; two remarkable instances of chemical union between bodies which unite in any proportions were shewn. Alcohol was mixed with coloured water in a bulb having a tube with small bore, and the fluid descended into the stem rapidly when inverted, proving that the compound was more dense. Sulphuric acid was also mingled with water, and a test-tube filled with ether placed in the mixture, the heat of which immediately boiled the ether. The lecturer then fully explained the nature and use of the large scale of equivalents belonging to the Institution.

The laws of chemical affinity were next introduced and illustrated by various experiments. In shewing the change of form, state, colour, and general character, occasioned by chemical union, Mr. Hemming displayed the following experiments. Two invisible gases, the ammoniacal and mu-

riatic acid were admitted into a glass vessel, and formed a solid opake substance. Two colourless liquids, dilute gallic acid and solution of sulphate iron, were mixed and formed an intense black liquid; some nitric acid was added to it, and the liquid was instantly colourless; liquid ammonia was added to this, and the compound was again converted to a deep black colour. Two invisible gases, the nitrous and oxygen, were mixed together, and formed a dense red fuming gas, the nitrous acid. Two transparent fluids, one a solution of muriate of lime, the other sulphuric acid, were combined, and formed a solid mass of matter, the sulphate of lime.

Mr. Hemming then stated, that, by a knowledge of the effects of chemical affinity, we are enabled to analyse substances, discover their component parts, and detect the impurities with which various articles are contaminated, or adulterated. The lecturer shewed the mode of detecting the most prevalent impurities in water, such as copper, lead, and iron; the sulphates, muriates, and carbonates of lime, magnesia, and soda; also, carbonic acid and sulphuretted hydrogen. The mode of discovering the minutest quantity of alum in bread, by treating an infusion of it with muriate of barytes, was then shewn to the great amusement of the audience. The bread introduced by Mr. Hemming had been purchased that morning, and seemed by no means deficient of the essential component, alum. The means of detecting lead in wine by three different tests, of copper in pickles, and of sulphuric acid in vinegar, were then successfully illustrated by experiments.

Mr. Hemming then exhibited the manner in which the smallest quantity of arsenic may be discovered by exceedingly delicate tests. A few drops of solution of arsenic was added to distilled water, and placed in four different glasses; to one was added liquid sulphuretted hydrogen, which rendered the solution instantly turbid, and of a deep yellow colour; to another, was added a solution of nitrate of copper, and liquid potash, which produced a green precipitate; to a third, a solution of nitrate of silver and ammonia, which threw down a flaky light-green substance; in the fourth, a glass rod dipped in ammonia was held in contact with a stick of nitrate of silver, and a similar precipitate was collected.

Corrosive sublimate was detected in solution, by lime-water, which rendered the mass of a turbid orange colour, and its transparency was immediately restored by an acid.

The lecturer, then, after some observations on the frequent serious accidents that had occurred by mistaking oxalic acid for Epsom salts, exhibited some simple tests in the possession of almost every person, by which oxalic acid might be instantly discovered. A dip of ink immediately reddened oxalic acid, but made the Epsom salts black; a piece of whiting, effervesced violently in the acid, but not in the salts; pearl-ash produced the same effect; lime-water instantly rendered the acid turbid and opake, but, when added to the salt, was perfectly transparent.

Tuesday, March 4, a Meeting of the Members was held to elect by ballot a President, four Vice-Presidents, a Treasurer, and fifteen of the Committee of Managers for the ensuing year, when the following were duly elected:—President, Dr. Birkbeck; Vice-Presidents, Professor Millington, John Martineau, Charles Toplis, and T. S. Peckston, Esqrs.; Treasurer, Alderman Key; Committee, Messrs. Clarke, Merrett, Stratton, Pritchard, Bacon, Conder, Tovey, Hetherington, Ward, St. Leger, Collar, Button, Carter, Smythe, and Morton.

Wednesday, March 5, a Quarterly General Meeting of the Members was held to receive the Committee's report, detailing the recent proceedings and present state of the Institution, from which it appears that the affairs of the Society are of a gratifying nature: the number of Members was stated to be 1247.

Two Honorary Members have been admitted, Mr. Thomas Hodgskin, for a Course of six Lectures on the *Physiology of the Mind*: and Mr. Edward Moschay for a donation of ten guineas.

The financial statement was favourable, the receipts having exceeded the payments, and enabled the Committee to make up former deficiencies. A numerous list of books presented to the library during the quarter was read; and the different classes for instruction in writing, arithmetic, mathematics, drawing, chemistry, and the English and French languages, were proceeding as at the last Quarterly Meeting. Preparations were completed for forming a new class for mutual instruction in experimental philosophy, to meet every Thursday evening in the Apparatus Room.

The various Courses of Lectures delivered during the quarter were enumerated, but these have been already noticed by us as they were delivered.

It was stated, that early in the quarter then commencing, Dr. Birkbeck would resume and complete his extensive Course of Lectures on the *Functions of the Human Body*; and that Professor Millington's Course on *Hydraulics*, Mr. Peter Christie's Course on the *Decorative Branch of Civil Architecture*, and a short Course by Mr. Peckston on *Gas Lighting*, were also reserved for the present quarter.

Russell Institution.—At this Institution, on Thursday evening, the Rev. Henry Stebbing commenced a Series of Lectures on the *Progress and present State of Periodical Literature*. The Rev. Lecturer took an interesting and lucid view of the importance of the subject for consideration—of the general history of literature—of the causes of the present high intellectual activity in England—and of the characteristics of the public mind.

CHEAP CHEMISTRY.

To the Editor.

Sir,—As the study of chemistry appears to be as attractive as it is useful, and as the attention of my brother members of the London Mechanics' Institution to this branch of science appears to be revived by the lectures now delivering by Mr. Hemming, I purpose furnishing you with a few communications to prove that the study of chemistry may be pursued, and many of its most important facts experimentally illustrated at such a moderate expence, as may come within the means of the most humble individual. I conceive that I am qualified for this task, for I have occupied my leisure in chemical pursuits ever since my predilection for them was excited by the lectures delivered by Mr. Phillips to the members of the London Mechanics' Institution in Monkwell Street; and can perform many of the most pleasing and important experiments in the science, although I believe that the value of my apparatus does not exceed twenty shillings. I, therefore, think that those whose circumstances

are as humble as mine, will be gratified to learn that they need not be deterred by the fear of incurring great expence from pursuing experimentally the study of this most important and delightful science. I propose describing the mode of preparing the most useful preparations and tests, in an economical manner, and also what substitutes may be employed for the costly apparatus usually introduced at lectures.

It is indispensable that the student be provided with two glass retorts, which may be purchased at the glass blowers for about 10*d.* each, and a cylindrical vessel to receive gas, which will cost about 1*s.* 6*d.* An iron retort for oxygen gas may be cast at the iron founders, if a wood pattern be taken, for about 2*s.* 6*d.*, (at the mathematical instrument maker's they cost 14*s.*), and a piece of lead tube to conduct the gas into the pneumatic trough for about 1*s.* A small pneumatic trough, with shelf, may be manufactured by any tinman for about 4*s.*, which, when painted inside and outside, will be as serviceable as the expensive troughs usually employed. Two dozen phials with corks will be as convenient for tests and solutions as the stopped bottles generally used. The bottles for acids and ammonia should, however, be furnished with glass stoppers.* The acids, alkalies, manganese, salts, &c. may be purchased at Anthony's, Saffron Hill, of the best quality, at very moderate prices. The following articles are requisite for the student, to which I annex the prices charged by Mr. Anthony.

	s.	*d.*			*s.*	*d.*	
Sulphuric Acid	0	3	lb.	Oxalic Acid	0	8	oz.
Muriatic Acid	0	4	lb.	Sulphuric Ether	0	6	oz.
Nitric Acid	1	4	lb.	Fused Potash	0	3	oz.
Sulphate Soda	0	3	lb.	Liquid Ammonia (fort)	1	6	lb.
Sub. Carb. Potash	0	8	lb.	Chlorate Potash	1	0	oz.
Bi. Carb. Ditto	3	0	lb.	Phosphorus	4	0	oz.

The following articles may be purchased at any oil shop. I insert, for the benefit of the learner, the scientific and commercial names.

	d.	
Sulphate of Copper (Blue Vitriol)	1	oz.
Sulphate of Alumina and Potash (Alum)	½	oz.
Nut Galls	2½	oz.
Acetate of Lead (Sugar Lead)	2	oz.
Sulphate of Iron (Green Copperas)	3	oz.
Logwood	4	lb.
Sulphur	½	oz.
Sulphate of Zinc (White Vitriol)	1	oz.
Laminated Copper (Dutch Metal)	2	per book.

* Two Florence flasks at 2*d.* each, half-a-pound of glass tubes, various sizes, which cost 1*s.* 9*d*, two crucibles at 1*d.* each, a japanned burner cost 7*d.*, and a few corks (various) will be also requisite. The burner may be filled with gas ether, in lieu of alcohol, as it is much cheaper, and emits no smoke. The ether may be purchased of Mr. Gordon, Cornhill.

Small quantities of antimony, arsenic, bismuth, mercury, test papers, barytes, chlorate mercury, strontia, magnesia, and other chemical preparations may be procured on very moderate terms at Wilson's, Holborn Hill, where also distilled water (indispensable for solutions and some delicate experiments) is sold at 6*d.* per gallon. The grosser metals, as copper, tin, lead, zinc, &c. are purchased most advantageously of those persons who work them. Most of them may be obtained at the founders' in Shoe Lane, or in Drury Lane.

To shew the saving that may be effected by the student making his own preparations, I here insert, from a printed list of an eminent vender of chemical compounds, the prices at which some of them are sold, with the prices at which they may be made, or the prices charged at the houses I have stated.

	Price charged by Mr. J.		Price at which it may be obtained.	
	s.	*d.*	*s.*	*d.*
Muriatic Acid	1	4 lb.	0	4 lb.
Sulphuric Acid (con.) ..	8	0 lb.	0	3 lb.
Liquid Ammonia	5	4 lb.	1	6 lb.
Antimony	4	0 lb.	1	0 lb.
Copper filings..........	8	0 lb.	1	4 lb.
Sulphuric Ether........	2	0 oz.	0	6 oz.
Lime	1	0 lb.	0	1 lb.
Tincture Litmus........	0	6 oz.	0	1 oz.
Muriate Barytes (sol.) ..	0	6 oz.	0	1 oz.
Muriate Copper (sol.) ..	1	0 oz.	0	1 oz.
Muriate Lime (sol.)	1	0 oz.	0	0½ oz.
Nitrate Copper	1	0 oz.	0	1 oz.
Chlorate Potash	3	6 oz.	1	0 oz.
Sulphate Iron	0	6 oz.	0	0¼ oz.

This statement alone is, I conceive, sufficient to shew that my communications on this subject will not be unimportant to the student of limited means. No man will deride the humble and inelegant apparatus of a beginner in the art, who reflects that the splendid discovery of the latent heat of steam by Watt, was made by a flask and a few glasses, the value of which was probably less than 2*s.* Mr. Cooper, the chemical lecturer, justly received from a crowded audience at the London Mechanics' Institution, an enthusiastic burst of applause, when he displayed a rude vessel, similar to an oyster tub, with a shelf in it, which had been his pneumatic trough for several years.

In my next letter I will describe the mode of preparing various tests and gases.

I am, Sir,
Your obedient Servant,
A Member of the Lond. Mech. Institution.

New method of applying Heat.—A patent has been recently granted to Messrs. Beale and Porter, for a new mode of communi-

cating heat, which embraces a principle, applicable to every branch of the arts and manufactures, where the employment of a regulated degree of temperature is required.

The discovery arose from a course of experiments, undertaken with the view of safely generating steam at very high elasticities. Their labours have been so far successful, that their invention affords a certain method of producing steam at any temperature, and with any degree of pressure that may be desired, by means, which are free from the liability to accident from carelessness, or of irregularity in the effects produced.

It is generally admitted, that very high pressure steam is more economical than that generated at comparatively low temperatures, while the absolute safety of such steam, when generated in tubes of small diameter, is universally acknowledged. But objections have attended the employment of steam at very high densities, owing to the rapid destruction of the generating apparatus. The plans proposed under this patent, provide for the preservation of the generating apparatus, and, at the same time, avoid all risk of producing steam surcharged with caloric.

In addition to these most important advantages, the patentees expect to accomplish a material diminution of bulk and weight, as compared with ordinary boilers, and an economy in the consumption of fuel.

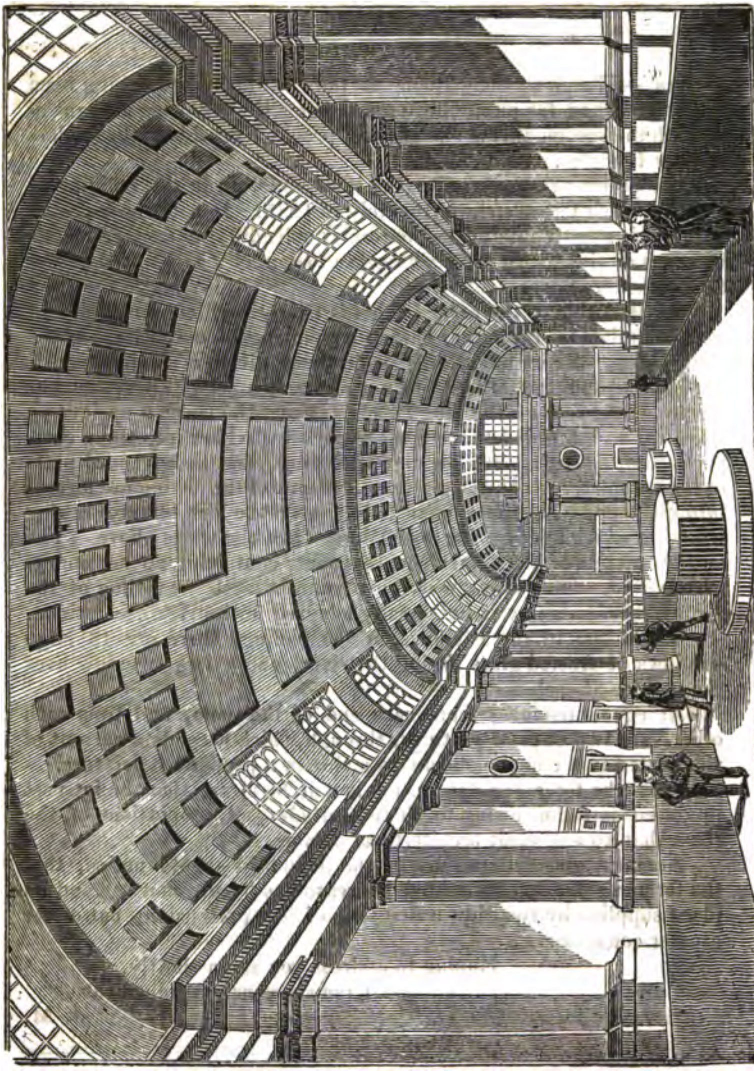
Among other objects, it appears to be peculiarly applicable to the boiling and refining of sugar, as it entirely prevents all possibility of burning or carbonising any portion of it, and ensures a regular degree of heat throughout the surface of the pans, by means which render it impossible for the ignorance or carelessness of the manufacturer, to produce any excess of temperature. The arrangement whereby this is effected, is perfectly safe, and simple in the highest degree. The apparatus is comparatively of little cost; nor is it so liable to derangement or destruction from the action of the fire, as the ordinary pans.

This patent is also valuable to the distiller, to whom it offers the certain means of applying, with the nicest precision, the degree of heat best adapted to his purpose. The great object of all recent improvements in this branch of the arts, has been, to avoid burning the matters contained in the still, and to prevent any empyreumatic flavor being imparted to the spirit. These desiderata are attained, by the method used under this patent, the heat being communicated to the still in such a manner, as to prevent its fluctuating, or reaching an injurious point. The means by which these advantages will be attained, we shall be able shortly to lay before our readers.

TO OUR READERS AND CORRESPONDENTS.

The spinning machinery of H. R. S. has been found *not* to answer.

Mr. H's lamp will shortly be inserted.



THE NEW LONG ROOM OF THE CUSTOM-HOUSE, LONDON.

THE NEW LONG ROOM OF THE CUSTOM-HOUSE, LONDON.

TO THE EDITOR.

Sir,—The new Long Room at the Custom-House having been recently opened for public business, I hope the following account of it, with the accompanying sketch, will prove acceptable to the readers of your Register.

The present room occupies the same situation in the building as the one which fell in so unfortunately in 1825. In point of imposing effect, it is greatly inferior to the former splendid, but fleeting fabric, being as distinguished for plainness and simplicity as its predecessor for profusion of ornament.

On each side of the room (which is nearly 200 feet long) are 14 massive pilasters (or rather antæ,) supporting an entablature of the Ionic order. Every alternate pair of these pilasters project considerably beyond the others, forming recesses which prevents the monotonous effect of the long façade. From the cornice springs an elliptical arch forming the cieling, which is divided into three compartments, by arches of less span springing from the advanced parts of the entablature. The larger compartments of the cieling are formed into plain pannels, those immediately over the entablature having windows which admit a borrowed light from the attics above. The smaller arches or belts have square coffers containing no ornaments of any kind. This forms a striking contrast with the cieling of the former room, which was universally admired for its rich decorations.

In addition to the windows in the cieling, there are 13 large windows of frosted glass facing the river, and a large window over the cornice at each end.

At equal distances from each end of the room, and from each other, are two circular gratings, through which ascends a current of air, heated in a chamber below to maintain a proper temperature.

From the foregoing description it will be clear, that the interest produced is rather owing to the magnitude and proportions of the room than to any great architectural display.

Amongst other alterations in the building I should notice, that the former grand but ill-lighted staircase has been removed, and its place supplied by two side staircases, of less pretension, but of far greater convenience.

Hoping to address you again shortly,
I remain your most obedient,
J. M.

PATENT SIZED AND GLAZED PAPER,

By Messrs. Gabriel de Soras, of Leicester Square, and J. & C. Wise, of Maidstone.—*Enrolled Feb.* 1828.

This invention consists, as stated in its title, in "certain improvements in sizing, glazing, and beautifying the materials employed

in the manufacture of paper, pasteboards, &c." The process is altogether novel, and we think one of importance in an economical point of view.

A ley is prepared with quick lime, the subcarbonate of soda, (or potash) with water in a vessel of white wood, until the alkaline solution shall be of 104° specific gravity; water being considered as 100°. With this solution a copper is to be about one-third filled, and heat applied either by naked fire, or by steam, but the latter is of course preferable. There is now to be added of white bleached wax an equal weight to that of the solution, and the whole to be stirred until a perfect union or solution of the wax is effected. If after a boiling of three hours this should not appear to be the case, (which will easily be discerned after a little experience, and without waiting till the materials have become cold to determine the fact,) then a little more of the alkaline ley may be added by degrees, to complete the operation. This being done, and while the solution of the wax is boiling hot, there is to be added to it more water, in the proportion of four gallons to every pound of wax in the solution, and the boiling continued. While this is going on, the farina of potatoes in the proportion of from four to four and a half pounds to every pound of wax employed, is to be separately mixed in a gallon of water, (that is, a gallon to *every* 4 or 4½ lbs. of farina,) and thrown into the copper; which being stirred up, the whole contents of the vessel will almost instantly assume the consistency and colour of a very fine white paste; in which state it will keep good in summer for about fifteen days.

The specification of the patent then proceeds to describe minutely the manner in which the potatoe farina may be obtained, namely, by rasping or crushing the potatoes in an apple mill, or under a pair of edge stones, into a pulp; then separating the fibrous part by means of sieves and coarse filters, and repeatedly washing the farinaceous product that escapes through the latter, until the water employed in the washings comes off colourless.

The patentees go on to state, that the product obtained from 10 lbs. of potatoes is 1 lb. of the dry flour, which at once proves the clumsiness of their process, as it has been repeatedly ascertained that potatoes contain almost double that quantity.*

The paste, prepared as above described, is to be used in the ordinary way of sizing paper, varying the quantity with the quality of the rags operated upon. If the rags be of the coarsest kind, about 3 lbs. of the pasty solution to 120 lbs. weight of rags in the pulp will suffice; if of middling fineness, about 4 lbs.; and if the very finest rags, about 5 lbs. of the paste. Previous, however, to the mixture

* For this and other reasons we have not considered it necessary to give the details of this part of the patentee's specification, especially as we have already described in the 18th No. of the Register, first series, the process at length, together with the representation of a machine better adapted than the ill-contrived and unexplained apparatus, recently published as novel in several periodicals, with the commendations of Sir John Sinclair, who appears to know very little of what is essential to the effective operation of such a machine.

being made into paper, a quantity of alum in solution, equal in weight to the wax employed, is to be mixed up with it.

The mixture is now ready to be made into paper either by hand or by machines in the usual manner. After the sheets are formed, it is advisable to dry them as speedily as possible by free exposure to the air, and not to hang more than 2 or 3 sheets upon one another, which should be parted before pressing. It is also recommended that the felts, used in the subsequent pressing of the new-made paper, be wetted in a weak solution of alum, and squeezed out by the press; and that the sheets of paper be two or three times alternately pressed and parted, by which process they will acquire a beautifully firm and glossy surface. The patentees likewise direct that the couching felts be not washed out with soap, but with the ley whenever required.

Although the *weight* of the potatoe flour is given in the dry state, there is no occasion to dry it, (which is a tedious operation) but employ it in the moist state, in which it deposits itself at the bottom of the vessels. Potatoe flour in drying loses 30 per cent. of water, which weight of water should be deducted in calculating the weight of flour employed. As several kinds of paper require only small quantities of sizing materials, those points must be regulated by the knowledge of the manufacturer.

COLOURLESS LAC VARNISH.

By Mr. George Field, of Sion Hill Park.

The varnish prepared by dissolving shell-lac in alcohol is, in hardness and brilliancy, superior to all others, except, perhaps, copal varnish; but can rarely be employed by the painter, on account of its dingy muddy yellowish brown colour. The Society of Arts have for some years endeavoured to draw the attention of artists to this subject, by offering a premium for lac varnish, sufficiently colourless for the use of painters. The premium was during the last year claimed by two persons, the above-mentioned gentleman, and Mr. Henry Luning, of Apothecaries' Hall, and on examination of the processes of each, they appeared to answer the intended purpose; accordingly, the Society very liberally rewarded both of them with a present of twenty guineas. We shall in the present number give Mr. Field's process, as described in the Society's Transactions, and in our next that of Mr. Luning, with the comparative experiments of Mr. Cornelius Varley on both the varnishes. The following is Mr. Field's process:

Six ounces of shell-lac, coarsely pounded, are to be dissolved by gentle heat in a pint of spirits of wine. To this is to be added a bleaching liquor, made by dissolving purified carbonate of potash, and then impregnating it with chlorine gas, till the silica precipitates, and the solution becomes slightly coloured.

Of the above bleaching liquor add one or two ounces to the spirituous solution of lac, and stir the whole well together; effervescence takes place, and when this ceases, add more to the bleaching

liquor, and thus proceed till the colour of the mixture has become pale. A second bleaching liquor is now to be added, made by diluting muriatic acid with thrice its bulk of water, and dropping into it pulverized red lead, till the last added portions do not become white. Of this acid bleaching liquor, small quantities at a time are to be added to the half bleached lac solution, allowing the effervescence which takes place on each addition to cease before a fresh portion is poured in. This is to be continued until the lac, now white, separates from the liquor. The supernatant fluid is now to be poured away, and the lac is to be well washed in repeated waters, and finally wrung as dry as possible in a cloth.

The lac obtained in the foregoing process is to be dissolved in a pint of alcohol, more or less, according to the required strength of the varnish; and after standing for some time in a gentle heat, the clear liquor, which is the varnish, is to be poured off from the sediment.

"White lac-varnish," says Mr. Field, "as above prepared, and used in a temperature of not less than 60°, dries in a few minutes, and is not afterwards liable to chill or bloom; it is, therefore, applicable to drawings and prints which have been sized, and may be safely and advantageously used upon oil paintings, which have been painted a sufficient time, as it bears out colour with the purest effect. This quality prevents it obscuring gilding, and renders it a valuable leather varnish to the book-binder; to whose use it has already been applied with happy effect, as it does not yield to the warmth of the hand, and resists damps, which subject bindings to mildew.

"As lac is the basis, even in name, of all metallic lackers, colourless lac may afford silver and steel lackers with little or no obscuration of their lustre. Its varnish polishes better than any other, and is applicable to some uses of the jeweller, to which purpose it has also been applied, as it has also been employed in the varnishing of light coloured woods, and cabinet work, to which it is applicable in the manner of French polish; and there can be no doubt it would afford lackers and varnishes of superior quality. In fine, the white lac varnish is generally applicable to the various purposes of other white hard spirit varnishes, and is to be used under the same conditions, and with the same management."

PATENT CANNON SHOT,

By B. Boothby, of Chesterfield Iron Works.

Cannon shot that are cast in iron moulds, usually possess in a greater or less degree, the three following defects:—first, being imperfect in their spherical figures, which is owing to the expansion and alteration of form made in the moulds, from frequently heating them;—second, containing air cavities, owing to the air being caught in the moulds, when the fluid metal runs into them too quickly for it to escape;—third, their having usually an indentation, where the metal is poured in. To obviate these defects, the patentee manufactures his cannon balls in the following manner:—

A solid ball of hard wood or metal is turned to a true sphere, (according to the size or weight of shot required,) and then cut in halves. These halves are moulded in sand boxes, in the usual manner of other castings, taking care that the sand be well rammed; then taken out, and the hollow moulds thinly coated with powdered charcoal, mixed with water. The boxes containing the moulds are next dried in the stove, preparatory to receiving the fluid metal. The shot thus cast, are said to be perfectly sound and spherical; owing to the air escaping through the sand, and the mould being unaltered in its figure by heating.

PATENT ENDLESS PAPER MOULDS,

By Louis Aubrey, of Two-Waters, Hertfordshire.

It has been usual to distinguish *laid paper*, (or paper made in hand moulds,) from *machine paper* (or that made on the endless wire web in a machine,) by the peculiar water-mark lines. Hitherto the machine paper has been made on very fine woven wire, which gives it that smooth, woven appearance; while the laid paper is marked by distinct parallel lines, crossed by a few thicker lines about an inch apart. The usual process of working wire, in making the hand moulds that produce the last mentioned effect, is tedious and expensive; but the paper made from them is generally preferable, and we believe is worth more in the market. The object of the patentee, therefore, appears to be, to make a paper resembling *the hand paper, by a machine;* accordingly, he has devised a method of *weaving* an endless web of wire, that will produce the same kind of water marks, as are exhibited in the laid paper.

The warp, consisting of the small wires, is put into the loom in the usual way, until the reed is filled to the width required. A wooden or metal roller, about five inches in diameter, containing in a line firmly fixed, as many metallic pegs, as there are large water lines required in the paper: these pegs stand out from the roller about a quarter of an inch, and answer to corresponding large divisions left in the reed. The large warp is then placed on to each of these pegs, and round the roller, until a sufficient length is obtained: the ends are then passed through the front harness, placed somewhat higher than the small harness, and from thence through the large divisions in the reed, where the ends are made fast to a stout iron rod. In this manner both warps are drawn tight, and the weaving is executed by the usual process. The superior thickness of the wires of the large warp, causes them to project, and to produce the coarse water lines in the paper made with it.

PATENT LAID PAPER MACHINE,

By Messrs. J. and C. Phipps, of Upper Thames Street, London.

The object of this patent, although the same as the foregoing, is effected by a different and less simple arrangement; yet it is easy of

application, and we make no doubt, answers the purpose. It consists of an addition to the patent machine of Didot and Fourdrinier, of a revolving cylinder, which impresses the peculiar water mark lines of laid paper, upon the wove paper, as the latter is received upon the felt, that takes it off the endless fine wire-gauze mould, used in those machines.*

For this purpose, the cylinder is formed of wooden discs at the ends, and concentric rings, and turns on a central iron axle. Over the periphery of the cylinder, the same kind of wire work as the laid paper moulds are made of, is wound round, and carefully joined at the seam. This cylinder is mounted over the felt, so as to rest its weight upon it, by turning loosely in vertical slots, made in brass bearings on the side frames of the machine: the wire work, therefore, passing upon the newly-made wet paper on the felt, produces the required water lines.

IMPROVED ICE SAW.

By Lieutenant W. J. Hood, of the Hyperion, R. N.

The vessels employed in the Greenland Fishery, and others that navigate the Polar Seas, are furnished with large saws for the purpose of cutting through the ice, and thus relieving the ship when frozen up. The lives of the crew not unfrequently depend on the expedition with which a passage can be cut, so as to disengage the vessel before the further accumulation of ice renders it an impossible undertaking. The saw, with a weight suspended to it, is introduced by means of a hole broken through the ice. and is suspended by a rope passed over a pulley fixed to a triangle. A party of a dozen or more men run out and back again with a rope, and thus move the saw up and down, till it has cut its way so far as to hang perpendicularly from the pulley. The triangle is then removed a foot or two further, and the sawing re-commences, the services of nearly the whole of the crew being required in this laborious undertaking.

Lieutenant Hood proposes to suspend the saw by a light sledge, and to work it by the power of only two or three men at the end of a lever: a bar, called a propeller, is fixed on the lever between the fulcrum and the saw, the other end resting on the surface of the ice, and so adjusted that each motion of the lever shall produce a cut of a given length, and at the same time, by means of the propeller, push the sledge on, so that the teeth of the saw shall always be in contact with the ice.

The figure gives a side elevation of the machine: *a a a* a sledge of open frame work, resting on the surface of the ice; *b* a transverse bar passing through the lever *c c*, and forming the fulcrum on which it moves; this lever has a cross handle, as represented in perspective by dotted lines: *e* a clamp or brace, consisting of two cheeks, one

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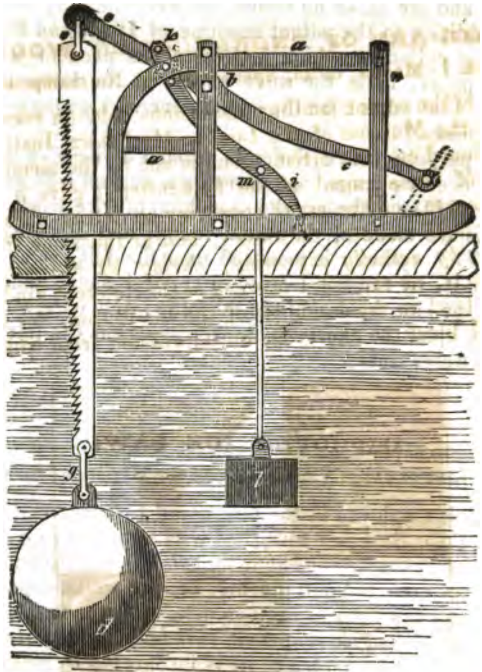
* See a description of these machines, Register of Arts, No. 89, first series: also, Dennison and Harris's Patent Machine, same number.



on each side of the lever, loosely pinned at top to the lever, and at bottom to the saw *f*; *g* a clamp similar to *e*, by which the weight *d*, (which is of the shape of a double convex lens), is hung to the lower end of the saw; *i* the propeller, an iron bar, terminating below in two claws, and at top in a fork, and suspended on the lever by means of a transverse pin *k*; *l* a weight hung to the propeller at *m*; *n* a transverse bar, limiting the motion of the handle end of the lever in an upward direction. It should be understood that there is a duplicate frame similar to that brought into view on the other side of the machine, about 18 inches apart, and connected by transverse bars. To prevent the lever from swerving laterally, there are at the handle ends two upright bars, between which the lever moves.

The saw after being once entered in the ice, will only require from two to four men to work it; and it need not be taken out of the ice till after the distance required to be cut through is accomplished. The saw can be guided by the lever in any direction, so as to cut the ice into pieces most convenient for removal, either by pushing them under the adjacent floor of ice, or by dragging them out of the ship's track into clear water.

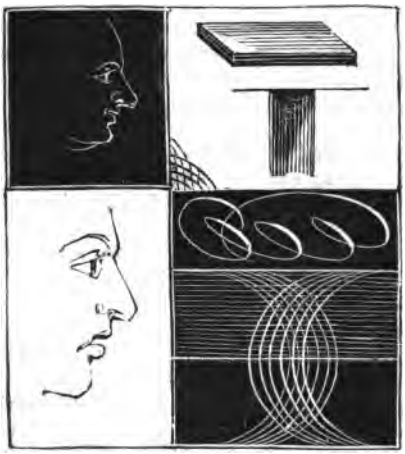
Lieutenant Hood has been presented by the Society of Arts, &c. with their large Silver Medal for the communication of this useful invention, a model of which is placed in its Repository.

Trans. Soc. Arts.

THE ART OF ENGRAVING ON WOOD,

By Mr. A. I. Mason, of 23, Spencer Street, Northampton Square.

At one of the recent familiar discussions held on every Tuesday evening, in the Museum of the London Mechanics' Institution, the above mentioned eminent artist, (who is one of the members of the Committee of Management of the Institution,) gave a very interesting discourse, on the art of engraving on wood. He explained in the most lucid manner, the theory, and at the same time shewed its practice, *by actually engraving, during his discourse,* several simple subjects, as examples of some of the different kinds of work. We are indebted to the kindness of the Institution, for the loan of the identical block so engraved, an impression from which is subjoined.



Mr. Mason first described the nature of the wood, which is box, and exhibited specimens of it as prepared for the engraver's use: for this purpose, the tree is cut transversely of the grain, (at right angles,) into slices, of the exact depth of printing type; then smoothed and rendered to a true plane. On this fine compact surface the subject is drawn, either with black lead pencil or Indian ink, but the latter is preferable, (except in works of a high finish,) as not being so liable to be effaced during the process of engraving; which process is the reverse of copper-plate engraving. In the latter, the incisions made in the metal receive the ink and print the design; but on wood, the raised parts form the design, receive the ink, and transfer the subject to the paper. Accordingly, in engraving a block of wood, all those parts of the space occupied by the design, which are not drawn upon, are entirely cut away, while all the permanent lines of the drawing are left untouched by the graver, and the tints are worked up by a series of lines, very similar to copper-plate engraving. In this department of the art, the know-

ledge and skill of the engraver is constantly exercised, as the nature and form of the lines require varying almost infinitely, to produce the intended effect. Mr. Mason produced several blocks drawn upon, some partly engraved, and others finished. From the latter he took some proofs, the manner of doing which is as follows. With a ball or dabber about 3 inches diameter, covered with silk, a small quantity of the finest printing ink is taken up, by repeated dabbing against a pallet, on which the ink is spread: the ink thus becomes thinly and uniformly diffused over the surface of the ball, which is then employed to dab over the engraved wood block, until the raised parts are covered with it. This being done, a piece of India paper is laid over the inked surface of the block, and over the paper a piece of thin glazed card-board; the card-board is then carefully rubbed over with a burnisher, the pressure of which, causes the ink on the block to be delivered on to the India paper, and transfers the design, which is the engraver's proof, and very superior in sharpness of line and general effect, to those impressions taken subsequently by the printing press; but the engraver's proofs being obtained by a tedious operation, it is not usual to take more than one or two of a subject.

Mr. Mason exhibited a great number of proofs of wood engravings, on all subjects, some of which were very highly finished; also various fac-similes, scrolls, &c. shewing the capabilities of the art.

While engraving, the artist took occasion to give an historical account of its origin and progress. If it was true, as asserted by themselves, that the art was invented by the Chinese, so far back as the Christian era, it appears that they had made but little improvement in it, as was proved by the exhibition of a permit of the "Celestial Empire," recently executed there.

Mr. Mason described the different modes practised by Albert Durer, and by foreigners of modern date. Some fac-similes of one of Albert Durer's, and another of older date from Caxton's Game of Chess, were exhibited.

The superior utility of wood cuts over other modes of engraving, was then distinctly pointed out; its greater durability than copper, owing to the mode of printing; and the peculiar advantage it possesses, of ranging and being printed together with the type. This part of the subject led Mr. Mason to describe the Ruthven and Stanhope presses, the difference of their action, and to make a comparative estimate of their advantages. Mr. M. then explained the necessity for care in printing from wood; the mode of *overlaying* various parts of a subject, that the dark parts may receive the full force of the press; and that the lighter parts, or the fine lines, may receive only a portion of it, (through the elastic medium of the blanket;) a proper attention to which, causes the impressions to have an infinitely better effect, than when this operation is neglected by the printer. When the requisite number of impressions have been taken off, the cuts should be washed clean from the ink, by spirits of turpentine and a piece of woollen cloth: this is essen-

tially requisite in reprinting from cuts, that have not been so cleaned previously, as the incisions frequently get filled up with ink, and the impressions from them in that state, present masses of black, instead of the design in proper relief. The printers are apt to clean the cuts with a strong alkaline solution, *scrubbing* them with a brush, as they do their types, which is frequently very detrimental to the work of the artist. To contrast the effects of careful, against careless printing, Mr. Mason exhibited two copies of a popular periodical: in one, the engravings appeared beautifully clear, being the proofs of the artist, mounted over the common impressions, which, as shewn by the other copy, were black, and apparently miserably executed.

While on the subject of printing, Mr. M. produced a copy of a work, wherein the cuts were finely printed on Chinese paper, thus shewing by contrast, the advantages and disadvantages of the art, by good and bad printing.

Mr. M. concluded by a very brief description of stereotyping; and had the satisfaction of having interested a numerous meeting of the members, by a discussion perfectly novel in the Institution.

SCIENTIFIC INSTITUTIONS.

ROYAL ASIATIC SOCIETY.—This Society held its anniversary on Saturday, the 15th; at a council previous to which, the annual election of officers took place. After the election, SIR ALEXANDER JOHNSTON gave some interesting details, of the progress made by the Committee, chosen to superintend the translation of Arabic, Hindu, and other MSS. This undertaking is so warmly patronized by literary and affluent men, that a subscription amounting to nearly £1000. a year, is devoted to this object.

LONDON MECHANICS' INSTITUTION.—On Friday the 7th March, Mr. HEMMING gave his Third Lecture on *Chemistry*, to a crowded auditory, of which the following is a condensed report:—

THE GASES.

MR. HEMMING commenced by observing that many of the most important properties of the grandest chemical agents could only be successfully investigated while they were in the state of gas, although those agents were found in the three different states of matter, solid, liquid, and aeriform. That the same description of matter is capable of existing in these distinct states is a fact well known to every chemist. We have, for example, oxygen in the solid state in the metallic oxides, earths and alkalies: and water contains it in the liquid state. Hydrogen assumes the solid state in coal, wood, wax, &c. and the liquid state in water, oil, ether, alcohol, &c.; but it is only in the gaseous state that they are simple and uncombined with other substances, and fit for successful chemical examination. An exception to this general observation must, however, be made in favour of some gases which Mr. Faraday condensed into liquids, by reduction of temperature and great mechanical compression. These, it is true, are uncombined with other matter, but in consequence of their tendency to assume their aeriform state, they exert a great force of expansion, and the resistance of the vessel containing them, only prevents

their acquiring their natural form. It is, therefore, as impossible to ascertain their properties in this state as when combined with other substances.

The gases are a numerous and important class of compounds, differing in character and property, each possessing some peculiarity by which it may be distinguished. One, for instance, is of a red colour, one a faint green, and another a violet. Some are inflammable, some support combustion, some are fatal to combustion, some redden litmus paper, one restores its colour, some are wholly absorbed by water, some by alkaline solutions, and some by mercury. Mr. H. illustrated these observations by appropriate experiments.

The term gas was adopted by Van Helmont, who ascertained the existence of aeriform substances differing from ordinary atmospheric air, and applied this word to distinguish them from air. He had a distinct notion of carbonic acid, which he called gas silvestre; and of hydrogen, or a compound of hydrogen, which he called unctuous or inflammable gas; he did not, however, procure either of these in their separate and simple state. Mayou has the honour of discovering the first distinct gas, and of introducing the mode of receiving gases in vessels filled with, and inverted over water. By treating certain metals with nitric acid, he procured nitrous gas. Dr. Hooke and Mayou also suspected the existence of a fluid which was aeriform in the atmosphere, and solid in saltpetre (the oxygen gas of modern chemistry), and asserted that this fluid was a grand supporter of combustion, or universal solvent. Dr. Mayou stated that it was also indispensable to animal life and vegetation, and the cause of acidity in the nitric and sulphuric acids. Subsequent discoveries proved the truth of these conjectures. It is a singular fact that Hales procured many of the most important gases, without suspecting that he had discovered any new substance. He had formed an opinion that every fluid different from air was only air contaminated or altered by the substance or process that produced it. He procured air from salt petre, which unquestionably was oxygen gas; air from coal and wood, carburetted hydrogen; and air from salt of tartar, carbonic acid. The discovery of either of these gases in its separate state would have immortalized any name, yet he did not examine their properties, and died without the honour of being a discoverer of any gas. The first aeriform fluid differing from the atmosphere, which was universally acknowledged to be a distinct and different substance, was the carbonic acid discovered by Dr. Black, and called by him fixed air, in the year 1756. In 1772 Dr. Rutherford discovered another distinct gas, since called nitrogen or azote. There were thus two aeriform fluids found when Dr. Priestly, the father of pneumatic chemistry, entered the field of science and eclipsed every competitor. Mayou's nitrous gas appears to have been considered after its discovery, as air contaminated by the metal or acid. Priestly re-discovered it, asserting its distinct existence, and also the following gases in rapid succession; oxygen, sulphurous acid, ammoniacal, muriatic acid, nitrous oxide, and nitrous acid. Priestly also introduced the mercurial trough, for the reception of gases absorbable by water. Mr. Hemming then stated the discoveries in this branch of science, by Scheele, Cavendish, Lavoisier, and other eminent chemists.

The lecturer then proceeded to explain the general properties of the gases, mechanical and chemical. Their absorbability by water, mercury, cork, and other substances; their expansion by heat, and different powers of conducting heat; their capacities for refracting light; their different sonorous properties; their quantities of vapour, and other interesting particulars.

Mr. Hemming then introduced the first in order of the gases, oxygen: it was discovered on the 1st of August, 1774, by Dr. Priestly. He procured it by heating red oxide of mercury in a flask, inverted over mercury, with a focus of the sun's rays collected by a powerful lens: he soon discovered its most remarkable properties as a supporter of combustion and of animal life. It is a permanently-elastic fluid, tasteless, colourless, and inodorous. Mr. Hemming stated its weight and specific gravity, and explained the different modes of procuring it. The properties of oxygen are of the most opposite and extraordinary kind: it is in one state of combination the only supporter of life; in others the most active destroyer of life. It is, when united with some

bases, the acidifying principle; with others the alkalescent principle: it is a component of fire, water, earth, and air. Its remarkable effects as a supporter of combustion were shown by the repeated inflammation of a taper immersed in it after the flame had been extinguished. The formation of water by a taper burning in oxygen was also exhibited; and, subsequently, of a metallic oxide, by burning iron-wire in a jar of oxygen. Mr. Hemming concluded by burning charcoal and phosphorous in jars of oxygen, and showing by the litmus test that acids had been formed.

On Wednesday the 19th March, Mr. Brown gave his Second Lecture of his Course on *History*.

MR. BROWN stated, that he should divide the subject of History into three parts. The first would comprise the history of the world, from its creation to its destruction by the deluge: the second, from the deluge to the birth of Christ: and the third, from the Christian era to the present time.

Mr. Brown then proceeded to make a series of trite observations on the Mosaic account of the Creation, and of the earliest ages of man, which, as they involve matters of religious controversy, the Register of Arts is not, we conceive, a proper vehicle for their dissemination. Among other fantastic notions, Mr. Brown imagined that the world was to be destroyed by fire, when it had existed 7000 years! (Why?) *Because* the mystical or perfect number 7, so frequently introduced in Scripture in reference to its duration, justified the supposition. The antediluvian race were of larger stature than those of the modern world, which he proved by reasons quite as mystical as the foregoing.

The lecturer finally called the attention of the audience, to two beautiful models of Stonehenge; one of them as it now is, the other as it was before its partial destruction. Mr. Brown made many ingenious observations, to shew the probability of this being an antediluvian structure, and that nothing but the deluge of the creation, could have produced the peculiar and partial destruction of the mighty fabric. It appeared to him evident, that an overwhelming torrent of waters flowing in a particular direction, had occasioned the overthrow of the huge masses of stone, some of which weighed between sixty and seventy tons.

It was announced, that on Good Friday the Institution would be closed; and that on Friday the 11th April, Dr. BIRKBECK would deliver his Lecture *on some peculiarities of the action of Air and Steam Valves.*

THE CITY OF LONDON LITERARY AND SCIENTIFIC INSTITUTION—Held its half-yearly meeting at Albion Hall, about three weeks ago; Geo. Grote, jun. Esq. in the chair. The report read by the secretary was highly favourable. A commodious theatre for lectures, has been erected in the rear of the house in Aldersgate Street, and the reading rooms, &c. have been much improved.

ARGYLL ROOMS.—Mr. Frost has announced his intention of delivering a course of lectures on Botany, at the Argyll Rooms, in the beginning of May.

IRON MINE.—The rich iron mine of La Voulte, in the department of Ardiche, in France, which has long been unworked, is now again rendered productive by the introduction of British machinery, and the superintendence of British engineers.

MISCELLANEOUS INTELLIGENCE.

Paddle Wheels.—Some of the newspapers have announced the recently-patented invention of Lieutenant Skene, of improved Paddle Wheels as something very extraordinary; they state that it will enable navigation to be carried on "to the extent of 30, 40, and even 100 miles an hour, *according to the power of the engine!*" We would suggest to the writer of the foregoing to set forth another patent that was taken out by a Mr. Meaden, at the same time as Lieut. Skene's, for carriage wheels, as being capable of running from 50 to 100 miles an hour, *according to the power of the horses!* We shall give a description of Lieut. Skene's patent as soon as the specification is enrolled: from what we can learn it possesses some merit; but such unqualified puffs as the above-mentioned are calculated to disparage a useful invention.

A Mineral Spring—which is likely to become a place of great public resort, has lately been discovered on the premises of Mr. Limer, distant from Windsor about a mile on the road to Wingfield. One gallon measure has been found by analysis to contain—muriate of magnesia 16 grains; lime 56 grains; sulphate of soda 152 grains; carbonate of lime 28 grains.

A Permanent Varnish—is obtained by rubbing iron, nearly red hot, wtth the horny hoofs of cattle, previously dipped in oil.

Lithontrity.—Of thirty persons afflicted with the stone, on whom M. Civiale, the French surgeon, has operated, twenty-five have been cured, and five are still under the treatment.

Ultramarine.—M. Tunel, inspector of the French ordnance, has discovered a new mode of preparing this beautiful pigment. The mode of preparing it is at present kept secret; but it will be some satisfaction to artists to learn, that he is enabled to sell it at about half the usual price, or about one pound sterling per ounce; and that the intensity of the colour is much superior to that usually prepared for sale.

Artificial Nitre.—A committee has been appointed by the French Academy, to examine into the practicability and expediency of establishing works, for the production of artificial nitre, according to a plan proposed by M. Longchamps.

Anatomical Preparations.—A mixture of spirit varnish and vermillion, diluted with a small quantity of water, which soon sets and becomes hard, is now employed for anatomical preparation. It is so penetrating, as frequently to return by the veins, and very convenient, from not requiring the application of any heat. It is said to be the invention of an American anatomist of the name of Ramsay, who endeavoured to preserve it as a valuable secret for the use of his dissecting room.

Natural History.—Messrs. Quoy and Gaymont, the two naturalists who accompanied the expedition under Captain Durville, in the Astrolabe, had fortunately sent to the French Academy no fewer than 574 valuable specimens of natural history, previous to the tempests, to which the vessel has since been exposed.

Dr. Ledebuhr has made a report to the senate of the University of Dorpat, respecting the result of the botanical travels, which he made in company with Dr. Mayer and Dr. Bunge in 1826, by order of the Russian Government, in the Altai Mountains of Siberia. The number of species of plants which they found, amounts to 1600, among which nearly 500 species are entirely unknown. They also brought home 700 species of animals.

Mexican Clover.—At a late meeting of the members of the Lyceum of Natural History at New York, there were presented many interesting specimens of Natural History, among which was some clover seed, from the country surrounding Mexico, where, owing to the favourable nature of the soil and climate, the clover attains a growth of *four feet,* in the space of thirty days from the time of sowing the seed.

Explosion of a Coal Mine.—An explosion has taken place at the Jarrow Colliery, near Newcastle upon Tyne, which has cost the lives of eight men. Accidents of this nature are said to be as frequent now, as previous to the introduction of the safety lamp.

Discovery in North America.—A Mr. Smith, engaged in the fur trade, in upper Missouri, has discovered a region, till now unknown, situated on the south-west of the great Salt Lake, and west of the Rocky Mountains.

Arab Corn Mills.—These are nothing more than a small flat stone, on which another is turned by the hand. These are usually placed in the laps of the women, who are the only millers and bakers in Arab families. The apparatus is precisely the same, as that used by the natives of Ceylon, delineated at page 91, vol. i. new series. The same kind of mills were common throughout Europe, before civilization introduced more potent machinery, worked by the wind, or streams of water. The principle of these little Arab mills, it will be observed, is precisely the same as that adopted in our large mills of the present day.

La Perouse.—A letter has been received by Sir W. Beetham, Dublin, from his nephew, Mr. John Russell, of the East India Company's ship Research, which contains intelligence of the fate of the unfortunate navigator, La Perouse. Mr. R.'s letter is dated from New Zealand, Nov. 7, 1827, and he states that it has been ascertained that La Perouse and his ships were wrecked off Manicolo Island, lat. 11°. 40′ south, and 170′ east long. One of the ships sunk completely, and all on board perished; the other was thrown on a reef, and such of the crew as escaped saved materials enough from the wreck to enable them to build a small vessel, in which they left the island about five months afterwards.

To revive Plants, &c.—Dissolve camphor to saturation in alcohol, adding the former until it remains solid at the bottom of the latter; a sufficient quantity of rain or river water is then to have the alcoholic solution added to it, in the proportion of four drops to 1 oz. of water. Plants which have been removed from the earth, and have suffered by a journey or otherwise, should be plunged into this camphorated water, so that they be entirely covered: in about two or three hours the plant will revive. It is then to be placed in good earth, watered, and protected from the too powerful action of the sun, until the roots have taken hold of the ground.—*Brande's Journal.*

Thebes,—according to a recent traveller, was built on the two opposite banks of the Nile, and divided into two prefectures; that on the east being called Thebarum Momus; that on the west, Phlouris, or Phalurites.

The Houses and Fortifications of ancient Athens.—The houses were, for the most part, small and mean in appearance, the streets crooked and narrow; the Piræeus alone had been laid out according to rule, in the time of Themistocles, by the architect Hippodamus. The upper stories often projected over the streets; staircases, balustrades, and doors, opening outwards, obstructed and narrowed the way. With the exception of the magnificent public edifices, they did not begin to build good houses until the time of Demosthenes. If the private houses of the Athenians were humble, the works undertaken by the state were upon a splendid scale. The fortifications of Athens were enormous; beside the Acropolis, the city and the Piræeus, with Munychia, were respectively fortified. The two latter embraced a circumference of eight English miles, with walls sixty Grecian feet high; they were built of square stones without cement, joined together with iron cramps. The city and the harbour were also connected by the long walls, the longer of which was equal to forty stadia, (five English miles,) the shorter to thirty-five, built upon marshy ground, raised with stones. To these were added in time of war, ramparts of earth, trenches, and parapets, for the strengthening of the works, together with the fortifications of the smaller places in Attica.—*Translation from the German of Aug. Boeckh, in the London Weekly Review, abbrev.*

Lofty Dwellings of the Arabs.—In Cyrenaica, it is not uncommon for the Arabs to live in excavated chambers, made in the steep and perpendicular sides of rocks, in places apparently inaccessible, and several hundred feet high. In these, whole families reside, ascending and descending by means of ropes.

TO OUR READERS AND CORRESPONDENTS.

Mr. Sk——d's plan of a Smoke Consuming Furnace is at present the subject of a Patent.

The paradox of W. W. will not suit the Register.

Other Correspondents in our next.

Fig. 1.

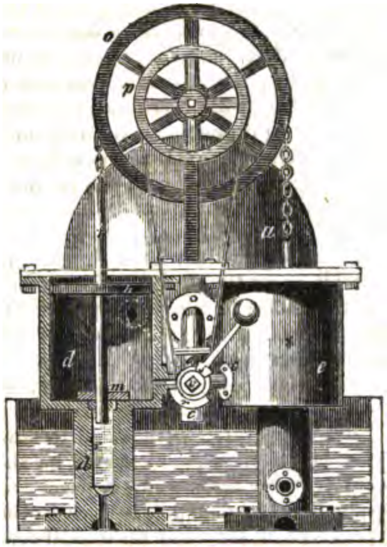
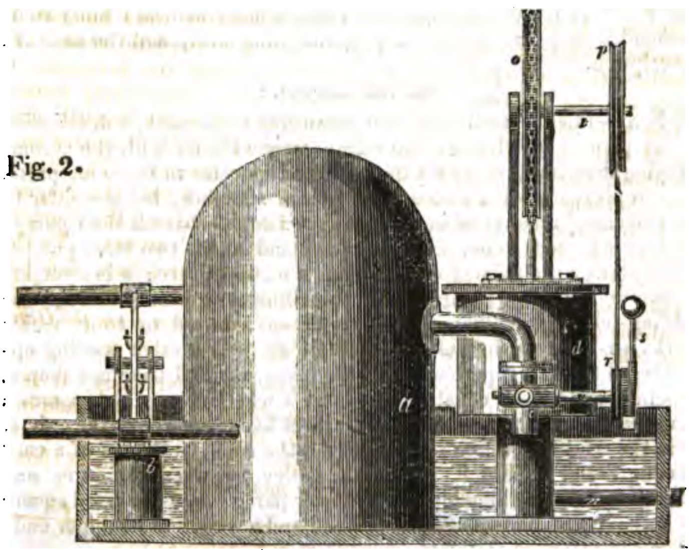


Fig. 2.



SELF-REGULATING HYDROSTATIC PRESS.

SELF-REGULATING HYDROSTATIC PRESS.

Upon reference to the 16th number of our last volume, p. 242, our readers will perceive that the author of the annexed interesting project was kind enough to promise it to us, as another modification of the principle of his "*self-adjusting crane*" therein described. We received it, agreeable to promise, on the 10th of December last, but the insertion was deferred from a desire to give the earliest information on some other subjects, with which the public at large were at that time particularly interested.

In the hydrostatic press of Bramah, in common use, the same time is occupied in pumping against a small, as against a great resistance: in almost all cases the operation is commenced when the resistance is at a minimum; during the process the increase is gradual, and at the termination the resistance is at a maximum. As a remedy for this practical inconvenience, hydrostatic presses are generally made with two levers of different powers, with the view of changing the power at some time during the process. Notwithstanding this provision, however, the time and trouble attending the change renders its assumed advantages a doubtful question of economy, and it is, consequently, rarely resorted to in practice.

By our correspondent's self-regulating hydrostatic press, the change of power proceeds in the same ratio as the change of resistance, without any care or interference on the part of the operator. The construction of this ingenious improvement will be readily comprehended on reference to the preceding diagrams, and the annexed description.

TO THE EDITOR.

Sir,—I beg leave to hand you, according to promise, a description of my plan of a Self-regulating Hydrostatic Press, with the accompanying drawings, in which the same letters refer to the same parts.

a represents what I term the vacuum chamber, being similar to the exhausted receiver of an air pump; *b* a double-barrelled air pump; *c* a four-way cock, connecting *a* with *d* and *e*, the two force pumps, and its lower end communicating with the atmosphere; *d* is a section of one of the force pumps; *f* is the plunger working through the stuffing-box *m*, and having a solid piston *h* keyed on to it, which works air-tight in the enlarged part of *d*: *g* is a valve opening upwards; *n* the exit pipe leading to the press, which I have not shown, it being of the usual construction; *o* is a wheel over which passes a chain connecting the two plungers; it is fixed square on the axle *t*, as is the wheel *p*, which serves to turn the cock, by means of a cord passing round it, and *r*, which is a pulley playing loose on *v*, and having a projecting shoulder on its lower part: *s* is a key fixed square on *w*, having shoulders at its lower end and a weight at its upper end: *v* is a rod attached to the plug of the cock *c*.

The action is as follows. Suppose the pistons in the situation shown in Fig. 1, the enlarged chamber of the forcing pump *d* is now open to the vacuum chamber *a*, and the chamber of *e* is open to the atmosphere *s*, the lower barrel of *d* is full of water. Upon rarefying

the air in the vacuum chamber *a*, by means of the air pump *b*, the air in the chamber *d* likewise becomes rarefied, and the piston *h* will descend as soon as the pressure on it exceeds the pressure on the plunger *f*, and a portion of water is thus forced into the press by the pipe *n*. By the descent of the piston *h* the wheel *o* revolves, and brings up the piston of the chamber *e*, the smaller wheel *p* is carried round at the same time, and turns the cock *r*, the shoulder on which taking the shoulder on *s*, carries it round a little past the vertical line, when it (*s*) falls into the position of the dotted line, and opens *e* to the vacuum chamber, and *d* to the atmosphere. The air under the piston of *e* now becomes rarefied, and it descends in like manner as the other. The larger the vessel *a* is made is in proportion to the chambers *d* and *e*, the better will the press accommodate itself to the changes of resistance.

Yours, &c. J. M.

PATENT MODE OF PAVING ROADS,

By Wm. Hobson, Esq. of Stamford Hill, Middlesex.

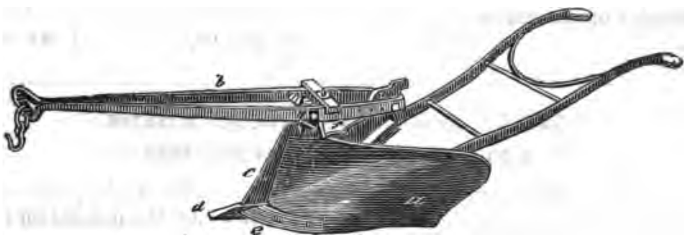
The patentee's project has nothing very novel in it: he proposes first to level the ground, or the materials of which the foundation is to be formed; then to ram it down, or roll it well, to a firm surface. On this, Mac-Adamized stones are to be spread, and rammed down level again; over this is to be laid the paving stones in the usual way, filling up the interstices by grouting, (that is, mortar in a liquid state, duly compounded of lime, sand, and water,) which will render the whole a hard and compact mass. The patentee also purposes to cover pebbled roads with broken Mac-Adams, and to cement these also together by grouting. The patentee of this *invention* is, we believe, a very wealthy man, therefore his wasting a few hundred pounds in a patent speculation, is of no serious consequence to him; but we question much if there is a mason or paviour of any experience, who has not seen, or assisted in executing, this very obvious mode of paving. The chief reason why it has not been extensively adopted in the public highways, is, the great expence it would incur.

PATENT IRON PLOUGHS,

By George Clymer, of Finsbury Street, London.

Mr. Clymer's patent ploughs having been strongly recommended to our attention, by a great practical agriculturist, we have been induced to examine the enrolled specification, and have now the pleasure of submitting a brief description of them to our readers. The specification itself is very long, as the patentee has felt it necessary to describe with great minuteness, the mathematical rules, upon which the curved surfaces of the breasts of his ploughs are generated, with numerous explanatory geometrical diagrams, the

details of which we shall omit, as they would occupy a larger space than can be well afforded. The shadowing of the annexed drawings will, however, compensate in a great degree for that deficiency, and afford a tolerable idea of the nature of the curves. As the object aimed at, is to gradually raise the clod of earth, cut out of the furrow, and turn it over, with the least possible friction or resistance of the earth to the uniform progress of the plough, it will be seen, that the several curves of the breast should blend with the utmost nicety and precision, to produce the best effect. The character and arrangement of these curves, will vary according to the nature of the soil; a stiff clay, or loam, requiring a very different opposing surface, to loose dry earth, or sand.



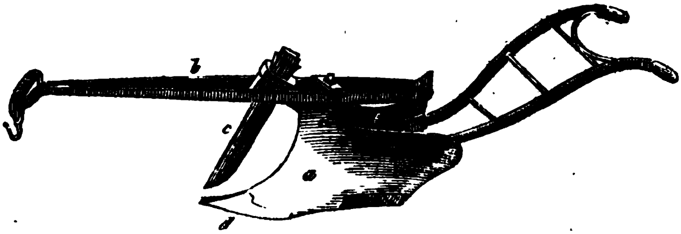
CLYMER'S PATENT PLOUGH FOR LIGHT LAND.

The above cut represents a perspective view of the plough on the breast side. *a* is the breast, *b* the beam, *c* the coulter, *d* the coulter-point, *e* the share, *f* so much of the land side of the plough as can be seen. The beam rests upon cross pieces at the head of the plough, and is there secured loosely by a transverse screw bolt *g*. The hind part of the beam is secured by a moveable pin passing through it, and through one of the several holes in the land side: this pin being shifted from one hole to the other, and the beam *b* turning upon the bolt *g* as a fulcrum, it is raised or depressed, so as to adjust its angle of inclination with the horizon at pleasure, causing thereby the plough to cut a deeper or a shallower furrow. The adjustment in a lateral direction is effected, by placing several rings upon the bolt *o*, as shewn, by the shifting of which, the direction of the beam with respect to the land side is altered, so as to make a broader or a narrower furrow; and by the same means, the plough is adapted to a single or double team of horses.

CLYMER'S PATENT PLOUGH FOR HEAVY LAND.

The construction of this plough is very similar to the one just described, except the breast *a*, which is materially different, as shewn: *b* is the beam; *c* the coulter, which is of the old kind, that being found the most efficacious in wet soils; it is fixed to an elongated part of the head on the land side; *d* the share.

These ploughs are made entirely of iron, and are extremely light;



they are put together, or taken to pieces, in a few minutes, being fastened together with a few screw bolts. They are, therefore, extremely well adapted for exportation, and for use in hot climates. We have been informed by a practical agriculturist, who has several of these ploughs in use, that they turn the land well, and leave a particularly clean and even bottom.

COLOURLESS LAC VARNISH.

By Mr. H. Luning, of Apothecaries' Hall, London.

In our last number, page 36, we gave Mr. Field's colourless lac varnish—the following is the process of Mr. Luning :—

Dissolve five ounces of shell lac in a quart of rectified spirit of wine; boil for a few minutes with ten ounces of well-burnt and recently-heated animal charcoal, when a small quantity of the solution should be drawn off, and filtered; if not colourless, a little more charcoal must be added. When all colour is removed, press the liquor through silk, as linen absorbs more varnish, and afterwards filter it through fine blotting-paper.

In cases where the wax contained in gum-lac would be objectionable, filter cold; if the wax be not injurious, filter while hot.

On comparing Mr. Luning's varnish with Mr. Field's, in the state it was sent to the Society, the former had the least colour, but it was owing to its being thinner than Mr. Field's. When both were brought to the same consistence they were equally colourless.

Some comparative experiments on the qualities of the two varnishes were made by Mr. Cornelius Varley (at the instance of the Society of Arts), who found great inconveniences to result from Mr. Luning's being too thin; and, likewise, that it contained a portion of wax, and some remains of the charcoal used in its preparation: these impurities Mr. Varley precipitated by the addition of the essential oil of turpentine. Mr. Varley found that Mr. Field's varnish dried quickly, leaving a brilliant and transparent glossy surface, and he gives a decided preference to it: he, however, observes, in his concluding remark to the Society, that "probably a union of the two processes may produce a varnish like water, though the colour of each is at present equal or superior to most of the varnishes now in use, and will therefore stand at the head as the chief varnish."—*Trans. Soc. Arts*, Vol. XLV.

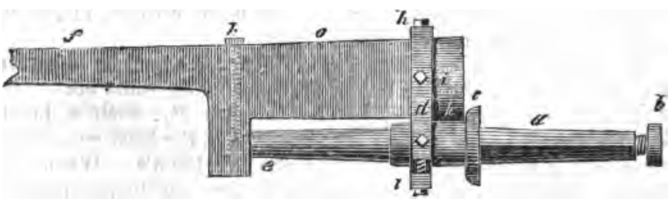
We think it is deserving of remark, that Mr. Luning's process is much simpler and more easily practised than Mr. Field's, and for this reason there is no doubt that it will be adopted in preference to Mr. Field's. The defects of Mr. Luning's varnish, pointed out by Mr. Varley, are not defects of the process, but must have been caused by mere accident or carelessness in the manufacture. Mr. Luning's varnish having been too thin must have arisen merely from his not having been aware of the thick consistence in which artists prefer using such varnishes.

In the Philosophical Transactions, vol. lxxxiv., is a chemical examination of lac by Mr. Hatchett, from which, it appears, that 100 parts of shell-lac consist of 90·9 resin, 4 wax, 2·8 gluten, and 0·5 extract. Cold alcohol will take up 81 parts of the resin, and leave the wax and gluten untouched; it would, therefore, be probably an improvement on either of the processes, to make the first solution of the shell-lac in cold, instead of in warm or boiling alcohol.

NEW PATENT AXLETREES,

For diminishing the friction of Wheels in Carriages and other machines, By William Spong, of Aylesbury.

The patentee proposes to effect the diminution of friction in carriage wheels, by supporting the weight on friction rollers, which are moveable on pivots, attached to the ends of a fixed axletree; while they are turned by a short revolving axle fixed into each nave of the running wheels. This arrangement will be obvious by an inspection of the annexed diagram of the parts to which the proposed improvements relate.



a e is the revolving axletree, made square at *a* for inserting into the nave of the wheel, to which it is made fast by means of the nut *b* screwing it up close to the shoulder *c*. The circular part of the axle revolves in two bearings; one in plummer blocks at *d*, regulated by screws at *l*; the other at *e* in a solid piece projecting from the axletree *f*. The thick end of the axle at *o* carries an anti-friction roller *k*, which turns in a short pivot or axis *i* (shewn by white dots). Oil is supplied to the bearings and axis by means of perforations at *h h*, which are closed by screw stoppers.

By another modification of the same contrivance, the patentee forms the part *a* of the revolving axletree, into a large tapered screw instead of the square bolt and nut; we have only represented the latter, as it is the best, and by far the cheapest plan.

Mr. Spong also proposes to apply his invention in diminishing friction in the axles of water wheels, and the rotary parts of machinery generally; but to such purposes, the application of anti-friction rollers is not new; with respect to its application to carriage wheels we very much doubt whether Mr. Spong will obtain a diminution of friction worthy of notice; for, were he to consult the published experiments made upon rail-roads, of the resistance of running wheels thereupon, as compared with those on common roads, he would find that the amount of the *friction of the axes* of wheels made in the common way, was so extremely trifling in comparison with the resistance at the peripheries of the wheels, that it became absolutely impossible to gain any practical advantage of moment, by a slight reduction of the friction of the axes, or as much as they are susceptible of. Let it be borne in mind, that the weight of the carriage must be supported upon some of the rubbing or revolving parts, and these parts being already comparatively very small, their surfaces cannot be much reduced, without impairing their requisite strength. By anti-friction rollers so applied, we only transfer the friction, without materially lessening it, while we incur complexity, increased expense, and more liability to derangement. We shall be happy to hear of Mr. Spong devoting his attention to an object better calculated to recompense him, than that of reducing the friction of the axles of carriages, which when *well made,* on the *ordinary plan,* amounts to only about the 200th part of the load.

PATENT IRON BEDSTEADS.

By R. J. Tomlinson, of Bristol.

It is a common defect in th frame-work of bedsteads, especially those made of metal, that the head and foot rail, and the two side rails of the bottom part, become drawn inwards by the tightening of the sacking cords, or the incumbent weight. The rails of brass and iron bedsteads, instead of retaining the form of a parallelogram, thus *take a set,* curving inwards; or the weakest rail becomes more distorted than the others: and this evil is increased every time the sacking is tightened; to avoid which, the rails have been made thicker, causing more expence, and rendering them inconveniently heavy and cumbersome.

By the patentee's method, however, the evil is entirely obviated, without increased weight. The side rails he makes to bow *outwards* a little; then he ties the ends of each bow by a slight iron rod, and connects each tie with its respective bow by cross braces, so that when *the sacking is laced to the tie rails,** no derangement of the figure of the bedstead can take place, while the whole structure may be extremely light.

* Though this is not the strongest way, it is sufficiently so for the sacking of a bedstead: albeit, it proved insufficient in the roof of the late Brunswick Theatre, of which, it is said, Mr. Tomlinson was also the patentee; but how a patenteeship could be sustained in such a roof, we are at a loss to discover.

INSTRUMENT FOR MEASURING GRAIN.

By W. Caffin, Esq., of Woolwich.

This is a very simple, ingenious, and well-contrived machine, which, according to the scale on which it is made, may be applied to the filling of cartridges, its original destination, or to measuring grain, seed, and all other articles that are estimated by the levelled or *struck* measure.

Fig. 1.

Fig. 2.

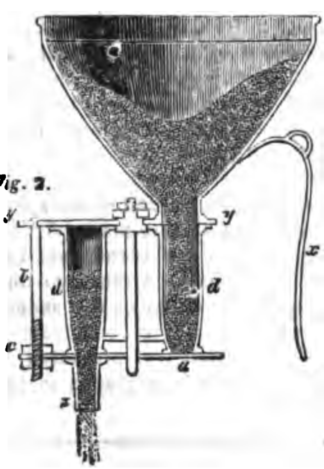


Fig. 1 represents a perspective view of the instrument, and Fig. 2 an elevation in section. The measures *d d* are fixed vertically in a circular plate *f*, opposite to each other, with an axis between them; upon which they work between two other plates. On the top plate *y y* a hopper *w* is fixed, communicating alternately with the measures, and filling them; and on the opposite side, in the bottom plate *a*, is a hole, with a spout *s*, through which the discharge takes place. The plates are framed together by three pillars *b b b*, having double-adjusting nuts *c c* on each to regulate the distance of the plates.

The measures are moved by a handle or lever *e*, the motion of which is limited by two pins *g g*, which, while it presents one under the hopper to receive, places the other immediately over the discharging hole for delivery, so that the two operations of filling and discharging are going on at one and the same moment. The bottom of each measure is contracted, to retard, in a small degree, the discharge, so as to secure one measure to be filled before the other is emptied. A hole is cut in the top plate, over the discharging measure, by which it may be ascertained that it is always full, as well as that the whole contents are delivered: *x* is the handle.

Machines of the size of the model have been used for a long

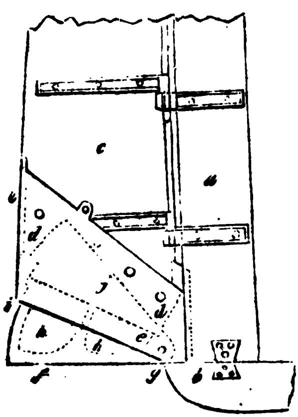
time for filling cartridges, and a boy delivers with ease 12,500 measures daily from one machine, in the most accurate and perfect way possible, and supplies his hopper himself.

The large silver medal was awarded to Mr. Caffin, for his communication of this his invention, a model of which is placed in the Society's Repository.—*Trans. Soc. Arts.*

NEW SLIDING RUDDER,

By Mr. JOSEPH HILLMAN, of Deptford.

SHIPS of war and other large vessels, if they happen to strike the ground when riding heavily at anchor, or by tailing on a sand-bank, are very liable to injure the rudder, by tearing it away from its fastenings. To prevent this, Mr. Hillman proposes that the lower part of the rudder should be made capable of sliding up, into a cavity prepared to receive it, and of descending, by its gravity, into its original position, as soon as the vessel gets clear again. The changes in the construction of the rudder, which Mr. H's. plan will occasion, are represented in the subjoined figure, which is a broadside view of it.



a the stern post; *b* part of the keel: *c* the rudder, the bottom of which is cut away to the dotted lines *d d*; *e e* is a hollow metal case, bolted on by the five metal bolts above *d d*; *f f* is a metal segment, turning on the pin *g*, and sliding within the case *e e*; this segment is made hollow from the top, on two compartments, as shewn by dotted lines *h h*; it falls down by its own weight, as shewn in the figure, and is prevented from coming farther by a projection from its top, lodging on a step at *i*, within the case *e e*. The cavity *j*, from the bottom of the case *e e* to the dotted lines *d d*, is made large enough to receive the whole of the segment *f f*. If, therefore, the vessel should touch the ground, so as to endanger the rudder, this segment would slide into the recess, and thereby avoid the blow: and fall out again, to restore the length of the rudder when clear of the ground.

The large silver medal of the Society of Arts was presented to Mr. Hillman for this invention, a model of which is placed in the Society's Repository.—*Trans. Soc. Arts.*

ROLLING PRESS FOR BOOKBINDERS,

By Mr. W. Burn, of Kirby Street, Hatton Garden.

The Society of Arts have voted their silver Vulcan Medal to Mr. Burn, for his application of a rolling press, instead of the common process of beating printed sheets, in order to make them quite smooth, previously to their being bound.

The press consists of two iron cylinders about a foot in diameter, adjustable in the usual way, by means of a screw, and put in motion by the power of one man, or of two, if more convenient, applied to one or two cranked handles. In front of the press sits a boy, who gathers the sheets into packets, by placing two, three, or four upon a piece of tin plate of the same size, and covering them with another piece of tin plate, and thus proceeding by alternating tin plates and bundles of sheets until a sufficient quantity has been put together, which will depend upon the stiffness and thickness of the paper. The packet is then pressed between the rollers, and is received by the man who turns the winch, and who has time to lay the sheets on one side, and to hand over the tin plates by the time that the boy has prepared a second packet. Thus a minion bible is passed through the press in one minute, whereas the time necessary to beat the same would have been twenty minutes. It is not, however, merely a saving of time that is gained by the use of the rolling press, the paper is made smoother than it would have been by beating, and the compression is so much greater, that a rolled book will be reduced to about five-sixths of the thickness of the same book if beaten. A shelf therefore, that will hold fifty books bound in the usual manner, would hold sixty of such if bound in Mr. Burn's manner, a circumstance of no small importance, when it is considered how large a space even a moderate library occupies, and that book-cases are an expensive article of furniture.

ESSAYS ON LITHOGRAPHY. NO. II.

(Continued from p. 335, Vol. I. N.S.)

Autographic Ink.

We proceed to describe practically, the process for preparing the autographic ink, or that kind, which is suitable for transferring on to the stone the writings or drawings, which have been executed on paper prepared for that purpose.

This ink ought to be mellow, and somewhat thicker than that used immediately on stone; so that when it is dry on the paper it may still be sufficiently viscous, to cause it to adhere to the stone by simple pressure. The following is the manner of preparing the ink:—

Dry soap	100	drachms.
White wax, free from tallow	100	do.
Mutton suet	30	do.

Shellac	50	drachms.
Mastic	50	do.
Lamp black	30 to 35	do.

These materials are to be melted in the way we have described for lithographic ink.

Autographic Paper.

The operation by which a writing or drawing is transferred from paper to stone, not only affords the means of abridging labour, but also of producing the writings or drawings, in the same directions in which they have been traced; whereas, when they are executed immediately on stone, they must be performed in a direction opposite to that which they are eventually to have. Thus it is necessary to draw those objects on the left, which, in the impression, are to be on the right hand. To acquire the art of reversing subjects, when writing or drawing, is both difficult and tedious; while, by the aid of transparent, and of autographic paper, impressions may be readily obtained, in the same direction as that in which the writing, or the drawing, has been made.

In order to make a transfer on to stone, of a writing, a drawing in lithographic ink, or in crayons, or an impression from a copper-plate, it is necessary, 1st, that the drawing or transcript should be on a thin and flexible substance, such as common paper; 2d, that it should be capable of being easily detached from this substance, and transferred entirely on to the stone, by means of pressure. But as the ink with which a drawing is traced, penetrates the paper to a certain depth, and adheres to it with considerable tenacity, it would be difficult to detach them perfectly from each other, if, between the paper and the drawing, some substance was not interposed, which, by the portion of water which it is capable of imbibing, should so far lessen their adhesion to each other, that they may be completely separated in every point. It is to effect this, that the paper is prepared, by covering it with a size, which may be written on with facility, and on which the finest lines may be traced without blotting the paper. Various means may be found of communicating this property to paper. We will give a preparation which we have always found to succeed, and which, when the operation is performed with the necessary precautions, admits of the finest and most delicate lines being perfectly transferred, without leaving the faintest trace on the paper. For this purpose, it is necessary to take a strong, unsized paper, and to spread over it a size prepared of the following materials:

Starch	120	drachms.
Gum Arabic	40	do.
Alum	21	do.

A moderately thick paste is made with the starch, by means of heat; into this paste is thrown the gum arabic and the alum, which have been previously dissolved in water, and in separate vessels. The whole is mixed well together; and it is applied warm to the

sheets of paper, by means of a brush, or a large flat hair pencil. The paper may be coloured, by adding to the size a decoction of French berries, in the proportion of ten drachms. After having dried this autographic paper, it is put into a press, to flatten the sheets, and they are made smooth by placing them, two at a time, on a stone, and passing them under the scraper of the lithographic press.

If, on trying this paper, it is found to have a tendency to blot, this inconvenience may be remedied, by rubbing it with finely pounded sardarac. We give below another recipe, which will be found equally useful, and which has the advantage of being applicable to thin paper. which has been sized. It requires only that the paper be of a firm texture.

Gum tragacanth	4	drachms.
German glue.....................	4	do.
Spanish white	8	do.
Starch	4	do.

The tragacanth is to be put into a large quantity of water to dissolve, thirty-six hours before it is mixed with the other materials. The glue is to be melted over the fire in the usual manner. A paste is made with the starch; and after having, whilst warm, mixed these several ingredients, the Spanish white is to be added to them, and a layer of this sizing is to be spread over the paper, as already described: taking care to agitate the mixture with the brush, to the bottom of the vessel, that the Spanish white may be equally distributed throughout the liquid. We will hereafter point out the manner in which it is necessary to proceed, in order to transfer writings or drawings.

We must not omit to notice two autographic processes, which facilitate and abridge this kind of work, when it is desired to copy a fac-simile, or a drawing in lines. The first of these methods is to trace, with autographic ink, any subject whatever, on a transparent paper, which is free from grease and from resin, like that which, in commerce, is known by the name of *papier végétal,* and to transfer it to stone; this paper to be covered with a transparent size; this operation is very difficult to execute, and requires much address, in consequence of the great tendency which this paper has to cockle, or wrinkle, when it is wetted. Great facilities will be found from using tissue paper, impregnated with a fine white varnish, and afterwards sized over. In the second process, transparent leaves, formed of gelatin, or fish glue,* are employed, and the design is traced on them with the dry point, so as to make an incision; these traces are to be filled up with autographic ink, and then transferred. We will describe, in their proper places, these processes, as well as that of transferring a lithographic, or a copper plate engraving.

(To be continued.)

* The method of preparing these leaves shall be hereafter given.

SCIENTIFIC INSTITUTIONS.

London Mechanics' Institution.—On Friday, the 14th, and Friday, the 21st March, Mr. Hemming delivered his fourth and fifth Lectures *on Chemistry*.—Report of the Fourth Lecture:

OXYGEN.

Mr. Hemming commenced with some observations on the great facility with which many refractory substances were reduced or dissipated if exposed in an ignited state to an atmosphere of pure oxygen. A more intense heat is, however, produced by directing a forcible stream of the gas on a burning body, in the manner of a blow-pipe current. This is an elegant and convenient mode of examining by combustion, small portions of earths, ores, metals, &c. many of which display during the process peculiarities by which they may be distinguished. To illustrate this, the lecturer directed a jet of oxygen on a piece of charcoal, which had a cavity scooped at the end for the reception of the substance to be operated on. The cavity was ignited, and some nails placed in it were almost instantly fused, and subsequently dissipated in vivid scintillations. Copper was then burned which emitted a bright green flame; strontian produced a red flame; lead a faint blue; and zinc a brilliant white. To show the intense heat of the metal thus melted, Mr. Hemming threw a globule of the iron when at a white heat into a vessel containing water to the depth of five or six inches: it remained red hot at the bottom of the water for a very considerable time.

Mr. Hemming then made some observations on the errors of the French theory of combustion, which was framed by Lavoisier, on the supposition that the base of the oxygen became fixed in the combustible, and that its latent heat and light produced the fire. In some cases of combustion the product is gaseous, therefore no fixation of the base occurs, as when sulphur or charcoal is burned; and in other cases, the *solid* oxygen takes the gaseous form, as when gunpowder and other detonating substances are ignited, yet the same result of light and heat are produced.

As the most important properties of the atmosphere depend on the oxygen it contains, it becomes a matter of importance to determine its quantity. The mode of ascertaining this belongs to the branch of science called Eudiometry. It is remarkable that air, which has been taken from a great variety of situations in different seasons; from extreme altitudes or the lowest depths, has been always found to contain the same proportion of oxygen—about 21 per cent. Mr. Hemming then proceeded to analyse the air of the room by the following different processes:—25 parts were measured and passed into a wide glass vessel; to this was added 25 parts of nitrous gas, which combined with the oxygen to form nitrous acid gas. This was absorbed immediately by the water, and when the residue measured, it was found that 21 parts had disappeared. As three volumes of nitrous gas combine with one of oxygen to form nitrous acid, one-fourth of the diminution, or $5\frac{1}{4}$ was the quantity of oxygen in the 25 parts examined. A tube graduated into 100 parts, containing a piece of dry phosphorous, was opened under water, the water rose indicating the quantity of oxygen absorbed by it to be about 21 per cent.; the nitrogen is by this mode increased in bulk about one-fortieth by holding phosphorous in solution. A solution of sulphuret of potash, and a solution of sulphate of iron strongly impregnated with nitrous gas, were separately agitated in eudiometer tubes, containing given portions of air, with similar results. A solution of sulphuret of lime also produced the same effect. Hydrogen gas was mixed with air in equal portions, and a given quantity exploded in Ure's eudiometer. The bulk was diminished; and as two volumes of hydrogen combine with one of oxygen by explosion to form water, one-third of this diminution was the quantity of oxygen contained in the air examined. This result corresponded with the preceding.

Mr. Hemming concluded by describing the mode of analysing air by balls of platinum and clay, ignited and passed under mercury into a tube containing the air for examination mixed with hydrogen. Water is formed by the union of the oxygen and hydrogen, and one-third of the diminution that ensues is the quantity of oxygen the air contained.

Wednesday, 9th April.—MR. BROWN concluded his Course of Lectures *on History,* when it was announced that on Wednesday, the 16th instant, MR. P. CHRISTIE would commence a Course on the *Decorative Branch of Civil Architecture.*

LINNÆAN SOCIETY.—March the 18th, EDWARD FORSTER, Esq. Treasurer, communicated to the Society the decease of Sir I. E. Smith, who had held the office of President of the Society since its establishment in 1788 till his death.

SOUTHWARK LITERARY AND SCIENTIFIC INSTITUTION, TRINITY PLACE, BLACKMAN STREET.—The following Lectures have been delivered with much success at this Institution during the month.

March 5th.—MR. FRANCIS *on Aerostation;* including its history and invention, with various representations of balloons—methods of filling—the different applications of gas, &c. &c.

March 12th.—MR. PRESTON concluded his Course *on Heat.*

March 19th.—MR. PHILLIPS *on the Properties of Metals.*

March 26th.—MR. HEMMING *on Chemical Affinity.* On Tuesday, the 1st of April, the Chemical Class resumed their meetings.

Since the removal to Trinity Place the number of Members have increased considerably. The donation of Books and Apparatus would prove of essential service to this Institution, as its Library at present only contains 400 volumes.

MR. DUFIEF, who is now teaching a large class at the London Mechanics' Institution, will give his Introductory Lecture *on the French Language,* on Wednesday, the 16th of April.

A Course *on Phrenology* is also announced to succeed Mr. Dufief, by DR. EPPS.

SPITALFIELDS MECHANICS' INSTITUTION.—The third anniversary of this Institution was celebrated on Thursday last; and a Report of its Proceedings for the last year was laid before the Members, by which it appears, that though the Society has had various difficulties to contend with, it is at present in an improving condition.

DEPTFORD MECHANICS' INSTITUTION.—MR. A. PRITCHARD has lately delivered a Course of Lectures *on Optics,* which he concluded by a Lecture on the important application of Optical Science to astronomical pursuits.

On Thursday, the 3rd instant, MR. HEMMING delivered a Lecture *on Chemical Action;*—when it was announced that, on Thursday, the 10th, MR. CHAMBERS would deliver a Lecture *on Prejudices.*

MISCELLANEOUS INTELLIGENCE.

Advantage of Railways.—The Glasgow Chronicle has given a particular statement of the performance of a single draft horse on the Monkland and Kirkintalloch Railway. The load was 50 tons, the total distance travelled 6.8 miles in 101 minutes.

A Concentric Circular Proportioner.—An instrument for abridging and facilitating calculations, adapted to very general application, has lately been invented by Mr. Joseph Lamb, of Newman Street; he calls it the "Concentric Circular Proportioner;" it is, in fact, founded upon the principle of converting the line of numbers (commonly called Gunter's Scale) into a circle. Two single and one double line of numbers are set in sub-divided cards on the face of the instrument; the middle circle, which is the moving piece, has both edges divided for the convenience of acting with the inner and outer circles, and a scale of estimation is arranged by double lines of figures, for multiplication, division, and common proportion. The principle is very simple, the correctness of the calculations demonstrated, and the instrument cheap and portable. The inventor, who formerly belonged to the Royal Artillery, appears not only to be a good mechanic, but an ingenious and skilful geometrician.

Expansive Force of Steam.—A correspondent of the British Traveller, relates a recent accident which happened in his kitchen, which illustrates the powerful effects of steam. A strong stone bottle, half filled with water, and tightly corked, was placed by a servant girl in an oven, and forgotten. The water, by the heat of the oven, was converted into steam, burst the bottle, drove the oven door, which was of cast iron, against the opposite wall, and broke it to pieces, and the oven itself, of great weight, tore down the fire-place, and blew out both the kitchen windows.

Delicate Workmanship.—Mr. P. Atherton has manufactured scissors of so minute a size, that twenty-six pair weigh only one grain.—*Sheffield Iris.*

Encouragement of British Genius.—At Rome at this moment, there are thirteen artists sent by the Russian Government, to study historical painting, while there is only *one* English student, and he is supported by the Royal Academy!

Brazil Spiders.—The spiders of Brazil attain an enormous size, with different habits from those of Europe. It stretches its web from tree to tree, and no longer appears a solitary insect: many hundreds live together, and form nets of such strength, that you may often see a bird of the size of a swallow, quite exhausted with struggling, and ready to fall a prey to its indefatigable enemy.

Bituminous Volcano.—The island of Java, which is distinguished by some of the largest volcanoes in the eastern hemisphere,

also presents the phenomenon of a volcano of bitumen, or black mud, forming a crater of about 16 feet in diameter. The tenacity of the bituminous mass is so great, that the gaseous exhalations from beneath, drive it up into a conical form, from twenty to thirty feet above the surface of the crater, when it explodes with a dull report, scattering a black unctuous fluid, having the odour of naptha, in all directions. After the interval of a few seconds, the surface of the boiling cauldron again becomes covered with a film or crust, and the phenomenon is repeated.

EARTHQUAKE.—On the 15th November last, at six o'clock P. M. the town of Popayan, about eighty leagues from the capital of Colombia, felt the first effects of an earthquake, by an undulating motion, which lasted several minutes. During the whole night the earth was sensibly affected, and every 40 or 50 minutes a shock took place. At three quarters past eleven in the morning, these shocks became so frequent and irresistible, that a large portion of the town was destroyed. Several shocks afterwards occurred, until at length they were terminated by an irruption of lava, which burst forth from the neighbouring volcanic mountain of Purace, and which swept away several villages through which it passed, the direction being from S.E. to N.W.

RUINS OF THE BRUNSWICK THEATRE.—The only correct representation hitherto published, of the state of this unfortunate edifice, immediately after the accident, is a lithographic print, from the able pencil of Mr. B. Dixie.

LIST OF NEW PATENTS SEALED.

WALLS.—To Caleb Hitch, jun. Ware, Herts. for his invention of an improved wall. Sealed 21st February. Two months for enrolment.

PAPER MAKING.—To George Dickinson, of Buckland Mill, near Dover, for improved machinery for making paper. 21st February. Four months.

MUSIC.—To Angelo B. Ventura, of Cirencester Place, Fitzroy Square, for improvements on the harp, lute, and Spanish guitar. 21st February. Six months.

HARNESS.—To Thomas Otway, of Walsall, Stafford, for an invention to stop horses when running away. 21st February. Two months.

FURNACES.—To William Brunton, of Leadenhall Street, for improvements in furnaces for smelting metals. 21st February. Two months.

LACE.—To John Levers, of Nottingham, for improved machinery for making bobbin-net lace. 3rd March. Four months.

WEAVING.—To W. Pownall, of Manchester, for improvements in healds for weaving purposes. 6th March. Four months.

GAS WORKS.—To Lieutenant William Roger, R. N. of Norfolk Street, Strand, for certain improvements on anchors. 13th March. Six months.

CEMENT.—To R. G. Jones, of Brewer Street, Golden Square, for a method of cementing china, and certain compositions which he denominates *cetnophanic*, translucent, or opaque china. 13th March. Two months.

WEAVING.—To George Scholefield, of Leeds, York, for improvements in looms for weaving fibrous substances. 13th March. Six months.

PROPELLING.—To Nathan Gough, of Salford, Lancaster, for improvements in propelling carriages and vessels. 20th March. Six months.

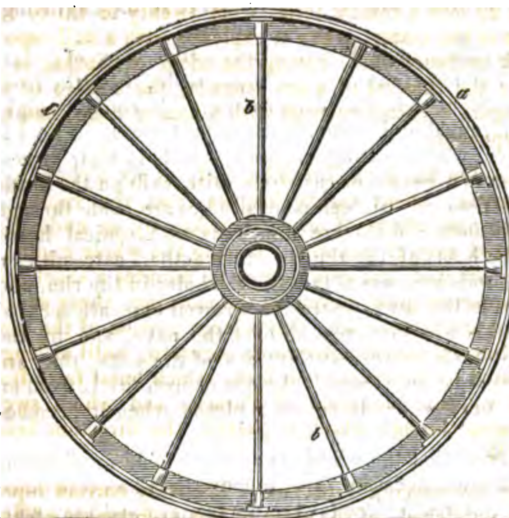
STEAM ENGINE.—To Samuel Clegg, of Chapel Walks, Liverpool, for improvements in steam engines and boilers. 20th March. Six months.

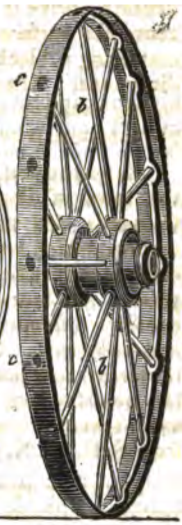
TO OUR READERS AND CORRESPONDENTS.

We thank a Member of the L. M. I. for his second valuable paper on "Cheap Chemistry," which will appear in our next.

Mr. Don's address is 65, White Lion Street, Pentonville.

Fig. 1. *Fig.* 2.





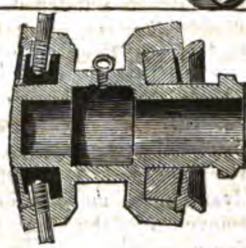


Fig. 3. *Fig.* 4.

PATENT SUSPENSION WHEELS,

By Theodore Jones, of Vauxhall, Surry.

The purposes to which iron (whether cast or malleable) may be usefully applied, are daily becoming more numerous: its great durability and the facility with which it may be made to any desired form, point it out as peculiarly adapted for wheels of carriages. Accordingly, various attempts have been made to construct wheels composed wholly of this material, but certain difficulties have opposed their general introduction, and their use has hitherto been confined to rail-roads. By a novel mode of construction, Mr. Theodore Jones appears to have overcome these difficulties, and has obtained letters patent for the invention.

A manufactory of the wheel has been established at Vauxhall, where the public are already being supplied. We have seen them

applied to several kinds of heavy carriages, and we conceive with those advantages of increased strength, durability, and reduced draught, as cannot fail to create a considerable demand for them. Their construction will be understood by reference to the engravings on the other side.

Fig. 1 is an elevation, and Fig. 2 a perspective view of a cart wheel. Fig. 3 is the nave shown on a larger scale, with the front shield or cap removed to show the construction. It contains eight feathers or divisions, dividing it into eight compartments. Fig. 4 is a section of the nave, with the front and back shields in their places.

a is a strong rim of wrought or cast-iron, with a rib on the inside to give additional strength. Sixteen conical holes are made through this rim at equal distances: *b b b* are iron rods with conical heads *c c c* fitting into the holes of the rim; on their other extremities a screw is cut; these rods are passed through the holes in the rim, and corresponding holes in the nave, where the screwed ends are secured by nuts. The shields are then placed over the nave, and by the pressure of their flat surfaces against the sides of the nuts, they are prevented from becoming unscrewed. A hoop or iron tire is fixed on the outer circumference, which is to be replaced when it becomes worn by use.

It will be observed that the wheels are not conical, or *dished* as usual, but cylindrical, which causes them to move with less resistance on their peripheries, or *run lighter* (as the phrase is); and they will, from the same cause, prove less destructive to the roads. This latter property may be considered as established as an act of parliament empowers the trustees of the roads to reduce the tolls on the cylindrical wheels, to two-thirds of the sum paid for conical wheels of similar width. The nave being suspended by the upper spokes or rods, instead of being supported by those which happen to be undermost, the cohesive strength of the material is made available, (the most advantageous mode of employing iron); and the weight being thus removed from the lower rods, they are not liable to be broken by sudden concussions or jolts.

Although the patentee has preferred giving an excess of strength in the first instance, their weight scarcely exceeds that of the common wheels; and from their being much less massive than those of wood they have a more elegant and light appearance.

PATENT MODE OF EXTRACTING METALS
FROM VARIOUS KINDS OF ORES,

By W. Jefferies, of Ratcliff.—*Enrolled Aug.* 1827.

The roasting of ores has been heretofore performed in a separate furnace; and the coke, with which the roasted ore is subsequently mixed in the smelting furnace, is also separately prepared in a coke oven. Thus, three furnaces and three distinct processes are resorted to. By Mr. Jefferies' plan, the roasting of the ore and the forming of the coke are performed in one furnace, and, consequently, with

great economy of time, labour, and expence. The process described in the specification is as follows:—

The ore is first broken by stampers, or crushed by rollers, until it is reduced to such sized fragments as will pass through a sieve of eight or ten holes to the square inch. After which (instead of introducing the pulverized ore into a roasting oven or furnace) it is incorporated with a sufficient quantity of small *coal*, and the mixture put into an ordinary coke oven, previously heated in the usual way. Herein the ore is calcined by the heat of the coal, and the latter is at the same time converted into coke, the door of the oven being left open until all the flame has passed off, in the ordinary manner, when the door is to be closed, and all access of air prevented.

After this, the charge is to be withdrawn, as if it were coke merely, and when cooled, broken down into masses of a proper size for the smelting furnace, into which it is thrown; the metal is here "smelted out" from the coke with which it was combined; the coke serving as the fuel to fuse and extract it.

As the quality of coals and of ore vary infinitely, the proportions required of each can only be determined by those circumstances, and the experience of the operator. Although no precise rule for the proportions can be laid down, it may be said, that there ought rather to be a superabundance than a deficiency of coal mixed with the ore, as the completion of the calcining process will thereby be insured, and the subsequent process of smelting be facilitated with but little waste of fuel.

By the old method of roasting, in a separate furnace, the pulverized ore is constantly stirred on the hearth, to expose every part to the action of the fire, and prevent the top surface from running or vitrifying, and thereby protecting what is underneath from the flame; but by the patentee's plan, every part of the ore becomes exposed to the full action of the fire, without the probability of its running together; and without its requiring to be stirred, or attended to in the oven, except to watch for the completion of the roasting, as ascertained by the discontinuance of the flame, and the appearance of the fumes, when the coke oven is to be closed.

COMMUNICATING WITH A STRANDED VESSEL,

By Mr. W. Thorold, of Milton, near Wymondham, Norfolk.

The considerable loss every year of valuable lives, by shipwreck on the British shores, had early attracted the notice of the Society of Arts, and premiums were offered, for the discovery of effectual means of diminishing the frequency of these distressing calamities.

In the year 1791, Mr. J. Bell, serjeant of artillery, was rewarded by the Society for his invention, which consisted of an 8-inch shell, loaded with lead, and having a light rope attached to it. The shell being discharged from a small mortar, on the deck of a stranded ship, would perform a range of about 200 yards, carrying the rope with it, and would bury itself in the sand on the shore, so

as to form a communication with the land, by means of which, boats or rafts might be hauled through the surf, and thus greatly facilitate the probability of escape from the wreck.

The objections to this plan, consisted in the difficulty of prevailing on the owners of merchant ships to incur the expence, and on the masters to have the apparatus in constant readiness for use. Besides which, many cases would no doubt occur, in which, from the pitching of the vessel, and from the sea beating over her, it would be impossible to project the shot in the right direction, or even to discharge the mortar at all.

It was, therefore, with much satisfaction, that the Society in 1808, conferred their large gold medal on Captain G. W. Manby, of Yarmouth, for very considerable improvements on the original proposal of Mr. Bell. These consisted in stationing the apparatus on the shore, instead of having it on board the ship, as indeed had previously been proposed by Mr. Bell, thus enabling, in the first place, a single apparatus to be used in aid of every vessel that might be driven ashore, on a considerable line of coast; secondly, enabling the persons intrusted with the apparatus, to become familiar with it, and therefore prompt in its application; thirdly, increasing the probability of success, by having the power of placing the mortar in the most favourable position, with regard to the vessel, and of arranging the rope, so as to render it much less liable to entangle, and thereby to break, than if it were thrown from the deck of the stranded vessel.

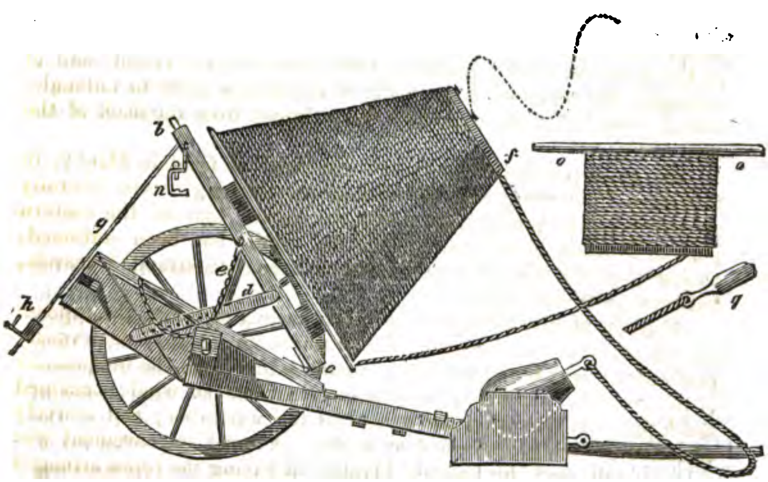
The great personal activity and exertions of Captain Manby, in this very interesting and meritorious undertaking, were liberally seconded by the government; and the result, that on the eastern part of Norfolk alone, where Captain Manby has been stationed, *no less than* 332 *persons have been rescued* from 48 stranded vessels, between 1808 and 1826.

Captain Manby's original method of coiling or faking the rope on the shore, was an operation that required to be very dexterously performed; was impracticable in some places, from the inequalities of the ground; was liable to derangement from the wind; occupied much precious time after the arrival of the apparatus; and scarcely admitted of being performed at night. A great improvement was subsequently made by Captain Manby, in having the ropes arranged in baskets, which allows of their being now conveyed, in a state ready for immediate use, to any place where they may be wanted. Under the management of Captain Manby, and his immediate assistance, the breaking of a rope, in consequence of its getting foul while running out, is a very rare occurrence. Other persons less accustomed to the business, and, perhaps less dexterous, have, however, frequently failed; and it seems to be generally allowed, by the associations on the coast of Norfolk and Suffolk, for relief in cases of shipwreck, some more certain mode of faking, or coiling the rope, would be an important improvement.

In 1823 Mr. Hase, of Saxethorp, in Norfolk, being employed to cast a brass mortar for one of Captain Manby's apparatus, stationed

near Cromer, constructed a skeleton reel, or rather conical spindle, as an improvement on Captain Manby's baskets. This reel was supported by an axis, which allowed of its being placed at any required angle, and the rope being wound round it, was expected to be delivered more freely, and with less risk of breaking, than by the usual mode. Experiments made at Cromer, confirmed the anticipation of the inventor, and the apparatus has now been in use for three years, and apparently has given much satisfaction.

Finally, Mr. Thorold has given to Mr. Hase's reel, a stronger and more compact form, has both expedited and facilitated the coiling of the rope evenly upon it, and has placed the mortar and reel upon wheels, so that it may be transported expeditiously to any place where it is wanted. The Society of Arts is, however, sensible that by so doing, the expence of the whole apparatus is considerably increased, that it is now scarcely capable of being conveyed by hand, as Captain Manby's, and even Mr. Hase's is; and that, therefore, situations may occur, to which it would be difficult, if not impossible to bring it.



The above figure presents a side elevation of the cart (with the near wheel off) and reel, and the mortar elevated into a position for firing. The axis of the conical reel is fixed in the centre of a strong wooden cross, which is framed and secured by four bolts, to the bars *b b*; these are hinged at *c*, to the cart; *d* is a bar of iron with holes, serving as an elevator; it is screwed on to the frame *b*, and one of the holes being placed on a pin fixed in the cart's side, retains the reel at the required angle. Two chains *e e* are fixed, one at each side of the cart, and to the frame *b b*, which retains it: while the reel is vertical, the elevator *d* catches the pin by its last hole. At *f* there is a *moveable* ring and winch handle, (not represented;) *g* a

guide bar, turning on pivots in the frame *b*, on which is a sliding box *h*, to be used in coiling the rope. Within the winch ring is a hook; a bend of the line being placed on this, the reel is turned once round, and the rope passed through the eye of the guide box *h*, properly constructed, and a pair of nippers (not shown.)

When the mortar is to be fired, the guide bar *g* is thrown back into the position represented, and the winch removed. The pressure of the guide bar being thus taken off, the elasticity of the cord causes it to rise a little, and throw off two or three of the upper coils; the next coil is kept in its place, by one of the assistants laying his finger on it, and not withdrawing it until the moment of firing. The mortar is to be placed a few yards to leeward of the reel, with the line attached to the shot. A clamp *n* hangs from the frame *b*, by means of which the last coil of the rope is to be bound to the rim of the cone, in order to secure it for travelling, the remainder of the line being on the frame *o o*. Another line, on a similar frame, is stowed in the tail of the cart, and in front of the axle-tree there is a locker for the shot, the peculiar form of which is shown by the separate figure *q*.

The time required for winding the line and firing the shot, is one minute and a half. Numerous certificates on the advantages of Mr. Thorold's apparatus accompanied that gentleman's communication to the Society of Arts, who have voted him the Silver Vulcan Medal. A model is placed in the Society's Repository.—*Trans. Soc. of Arts*,

PATENT UMBRELLA RODS,

By J. G. Hancock, of Birmingham.

This invention is a method of constructing light elastic rods for umbrellas, walking sticks, whips, &c. Willow rods of a suitable length have the pith contained in them bored out, and in its place are put metallic wires or rods. The wooden outsides are then reduced to the intended figure by the plane and other instruments; afterwards coloured and varnished to give them the appearance of whalebone. One end of the rods are capped with metal tips, the other end has the wires extending a little beyond the wooden cases, which are flattened and drilled to receive the wires that fasten them to the handles, and forms the joint on which they turn.

The patentee has, no doubt, made his calculations upon the comparative economy and utility of this contrivance, but we cannot, ourselves, help doubting the practicability of his constructing his compound rods as cheaply and as strongly as those of whalebone.

PATENT MEDALS AND COINS,

By E. Thomason, of Birmingham.

The raised rims and edges of medals and coins have hitherto been produced by the compression of dies over the whole surface at

once. The improvement or novelty introduced by Mr. Thomason, consists in making the raised rim of a separate piece to that which forms the central portion, and uniting them by solder. Thus, when plated or silver-gilt medals are to be struck, they may be surrounded with an ornamental rim of gold or silver, which is first prepared from a straight slip of metal, impressed with the pattern or inscription between steel rollers; these slips are then formed into rings, and soldered to the edges of the struck medals. We do not very clearly see the superior economy of this new process over the old, but the patentee, who is a very eminent manufacturer, has, probably, experienced it.

PATENT METALLIC CASES.

For forming Caissons, Jetties, Piers, Quays, Docks, Basins, Mill-dams, Light-houses, &c. By Edward B. Deeble, of St. James's St. Westminster. *Enrolled January* 1828.

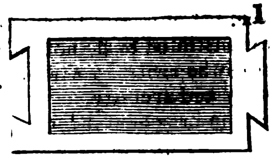
The object of this invention is sufficiently set forth in the above title; the nature of it consists in the construction of a peculiar description of cast-iron boxes, (or caissons as the patentee rather improperly terms them), variously combined by dovetails: these boxes when fixed in their places to form a pier, or the wall of a dock, &c., are filled with liquid lime and rubble, which soon sets hard, and forms a *solid mass girt with metal*. Thus the metallic caissons (it is presumed) will form an improved substitute for stone. The patentee states, that the results of various calculations of the comparative expense of granite and cast-iron caisson works, give in some cases 20 per cent., in others 30 per cent., and even 50 per cent. and upwards in favour of the caissons; and the advantage in the saving of of time, which in works on the coast is obviously of the highest importance, it is estimated will be at least four-fifths in favour of the latter.

In common dock or canal banking the thickness required in the side of the caisson toward the water would not exceed one inch; but where exposed to a heavy sea the thickness may be increased (in proportion to the pressure) to one foot or more, the other sides being less, and the interior, in every case, filled with liquid lime and rubble, or other suitable material to be found on the spot.

For the better elucidation of the plan, a few of the more simple forms of caissons and their mode of uniting, as exemplified in the construction of a pier, are engraved herewith.

The caisson is open generally both at the bottom and top, the thickness of the sides proportioned to the strength and gravity required. It is proposed that each caisson be seven feet in length, five feet in height, and from two to five feet in width, according to the nature of the work in which it is to be used. Caissons constituting foundations should be closed at bottom; and in raising one tier above another, each layer would become united to those immediately above and below it, by commencing the alternate vertical courses with a half caisson.

Fig. 1, is the plain oblong square, with dovetails at the ends only, applicable to straight lines, either in banking exposed to the water, or to the interior of heavy works, as cross-forts or bracings and buttresses to be buried in the earth. This form admits of little variation in its application, and none in its strength or gravity, beyond what may be gained by increasing the thickness of the sides.—Fig. 2 is the most universal form: it may be multiplied to any extent, yet is perfect in itself, requiring no change of form on the side to finish a work, and the ends may be conveniently completed, by filling up the dovetail groove with half a portable dovetail.—Fig. 3 is the radiated form, which may be used in a waved line along the coast, where great strength is required; it also applies to piers and bastions. The dotted projection is the half dovetail, which would be required to attach it to the cross-fort; or the radiated caisson, should it be considered necessary to add another waved line, would give the effect of arch and counter arch.—Fig. 4 is a radiated caisson, having extra dovetails for uniting the main line to the bastion. Any angle may thus be gained, simply by moving this caisson in the bastion in the direction required.—Fig. 5 is the termination of a pier with a bastion; the external dotted line shews the boundary of the sloped bank; the cross-forts are introduced at a suitable distance to ensure great stability; and the inner dovetailed grooves being left in the inner lines, will enable the engineer to add cross-forts or buttresses, to any extent that may be required.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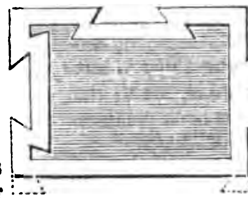
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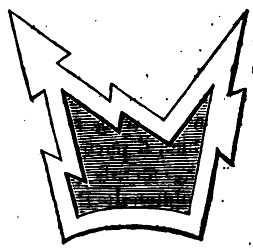
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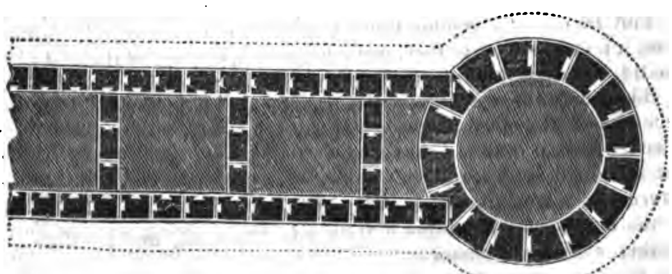

The patentee considers that the use of his metallic caissons, can be demonstrated to be not only practicable, but, in many situations, decidedly superior to the employment of stone, in respect both of economy and security.

PATENT AIR-TIGHT METALLIC PACKAGES.

By Mr. R. Dickenson, of New Park Street, Southwark.

In our third volume, page 9, we gave a description of a very similar invention to that which is the subject of the present patent, which has been communicated by a foreign inventor to the patentee.

It consists, first, in a new method of constructing metallic casks, tanks or packages, and likewise an improved mode of covering or coating them, to render them impervious to air or moisture; in order to keep the provisions good that are deposited within them, (which is their chief use and object,) and at the same time preserve the metal from oxidation.

The casks are usually of a cylindrical form, and made of plate iron, the bottom and sides being constructed water-tight in the usual manner; the upper part of the edge of the vessel intended for the lid, is to be turned inwards at right angles to the sides for the breadth of an inch all round, a broad hoop (about 3 inches wide,) is then fixed round the external edge of the cask, projecting above it about an inch and a half. Round the broad hoop is fastened another of less breadth but of greater strength.

The casks when thus formed, receive a coating of tin by the usual process, viz. by first steeping them in an acid liquor to take off the scales, then scouring them clean, applying a solution of sal ammonia, and dipping them in a bath of liquid tin. After this they receive another coating with an alloy, formed of tin 75 parts, and zinc 20 parts, to which 5 parts of pounded glass have been added, after the fusion of the metals. Into this mixture while in a fluid state, the vessels are plunged, the same as in tinning. They now receive a third coating of a mixture of pounded glass and linseed oil, which the patentee states answers the purpose of white lead.

The head or lids to these casks are made of iron plate tinned, of a circular form, to fit close within the broad hoop, and down upon the flat projection first formed; and are strengthened by flat rings, fastened round them. To render these vessels impervious to air and moisture, a pad is placed at the juncture between the top of the casks and the lid, this pad is formed of an annulus of tin plate, which is wound round with cloth and covered with oil skin, forming thereby an elastic medium between the two, which are compressed together, by means of six sliding bolts on the top of the lid, which point as radii to the circumference, and are placed into *inclined* slot mortices made in the external hoops of the cask. The inclination of these mortices, causes the lid to be drawn down tightly to the cask, and to effectually exclude air and moisture.

PATENT HORSE COLLARS,

By D. Freeman, of Wakefield, Yorkshire.

This patent comprises two distant objects; the one, a peculiarly constructed horse collar; the other, an apparatus for accurately measuring a horse's neck and shoulders with facility, so as to adapt a collar to its precise figure.

The new patent collar is to be thus formed. An internal frame of iron is first made; over this is fixed a lining, formed of whalebone or cane, padded, and wrapped round with stripes of coarse flannel or blanketting, which latter substance, the patentee considers to be the most eligible elastic material for the purpose. The collar is to be in two pieces, joined midway, either over the neck, or at the throat of the horse, by means of a hinge joint, the parts which separate being connected by a strap and buckle, or other common means. On both halves of this frame plates of metal are fixed, which extend to the front of the collar, where they are provided with two or more pairs of metal sockets, containing hollow screws, to receive solid screws; to the lower pair of these solid screws, D links are affixed, for the purpose of attaching the traces of the carriage; and to the upper pair of solid screws, are rings for passing the reins through. As these additions to the collar are intended to supersede the use of the hames, they are similarly provided with the necessary number of rings or D links, according to the station of the horses attached to a carriage, whether leaders, shaft horses, middle pair, &c.

The apparatus for taking a horse's form for a collar, consists of a wooden frame, with a hinge joint at bottom, and fastened at top in any convenient manner: this frame (which is passed round the horse's neck) has a series of holes made through it, at about three inches apart, into which a number of pins fit accurately, but with sufficient friction to remain where they are placed, the holes being, for that purpose, bushed with cork. The pins are pushed forward, till they come in contact with the horse's neck and shoulders, all round the frame; the frame being then removed, and a continuous line being drawn from the end of one pin, to the others in succession, a tolerably exact outline of the figure and dimensions for the new collar, is obtained, which outline may be transferred to paper, and sent to a collar maker at a distance.

IMPROVED ANGLO-MERINO WOOL,

By C. C. Western, Esq. M. P. of Felix Hall, Essex.

The wool that may be considered as the characteristic produce of this country, is that which has a long staple, and is known by the common name of *long* or *combing wool*. It is the material of worsted, and the basis of several of the fabrics made at Norwich. It is grown chiefly in the midland and eastern counties, particularly in Lincoln, Huntingdon, Northampton, and Leicester, and is con-

sidered by Mr. Western, to depend chiefly on the vigorous and luxuriant state of the animal, arising from the richness of the pasturage, and the care that has been taken to improve the breed, for a long series of years.

He considers that his theory is well founded, from the well-known fact, that long-woolled English sheep, when taken to France and other European countries, always degenerate, the wool becoming shorter, brittle, and wiry, in consequence of inferior feeding. Our long-woolled sheep are also remarkable for the fatness of the carcase; and the high price that is given for well-fed mutton, is the principal source to which the farmer looks for his remuneration.

The defects of long wool, as compared with the finer varieties of short wool, are thickness, or coarseness of the fibre, and the harshness of the feel; the manufacturers are, therefore, in their finer fabrics, obliged to intermix with the long wool, the softer kinds of short wool, spun silk, and the downy fur of the Canadian buffalo, the Peruvian vicugna, and the Cashmeer shawl goat.

Mr. Western, from observing the fineness and luxuriance of the Merino fleece, was of opinion, that by care and rich feeding, the wool might be lengthened so as to become fit for the comber, without much diminution of its fineness and softness; and if this were accomplished, at the same time that the carcase was not deteriorated, the result would be, a breed of sheep sufficiently profitable to the farmer, and the wool of which would be highly acceptable to the manufacturer. He accordingly instituted a series of experiments with this view, which have turned out very successful, and have also demonstrated a curious physiological fact, that the wool of Anglo-Merino sheep, when kept in high condition, will continue growing for two and even three years, the fibres showing no tendency to separate at the end of each year's growth. It appears, that the wool obtained by shearing the sheep triennially, will be long enough to be combed without any waste, and will afford a raw article for our manufactures, unquestionably better than any of the varieties of long wool now in the market.

PATENT METEOR STEEL,

By J. Martineau, Jun., City Road, and H. W. Smith, of Lawrence Pountney Lane.

This is a patent process for preparing an alloy of steel, having that peculiar wavy appearance, exhibited in the Damascus sword blades; and likewise for producing their toughness, and elasticity of temper.

An alloy, consisting of 100 parts, is thus compounded:—zinc, 80 parts; purified nickel, 16 parts; silver, 4 parts. These are put into a black-lead crucible, and covered with charcoal; the lid is then luted down to prevent evaporation, and exposed to the heat of an ordinary steel furnace, until the metals are fused, when the alloy is poured out into cold water, to suddenly cool it, which renders it so brittle, that it is easily reduced afterwards, by a pestle and

mortar, to powder, which is called by the patentees *meteor powder*, and is incorporated with the steel by the following process, together with the following singular mixtures.

Twenty-eight pounds of common blistered steel, ten ounces of the " meteor powder," seven ounces of powdered chromate of iron, one ounce of charcoal, two ounces of quick lime, and three ounces of porcelain clay, are put together in a crucible, and fused in a cast steel furnace. This alloy being subsequently drawn and hammered into bars, exhibits the Damascus wavy appearance on the surface. The foregoing proportions may be varied in some degree, and produce a similar effect. The lime and clay are employed simply as fluxes; the proportions mentioned of those earths are, therefore, not essential.

To bring out the Damascus pattern fully, upon any article manufactured of this alloy of steel, the surface is to be polished, and then washed over with an acid, (the nitric acid, with nineteen times its weight of water, is preferred by the patentees,) allowing the acid to operate a length of time, according to the effect desired, after which, the steel is to be well washed from the acid, when it exhibits the so much admired wavy appearance.

CHEAP CHEMISTRY.

TO THE EDITOR.

SIR,—I proceed to offer to your readers, according to my promise, instruction on the mode of performing chemical experiments, and making chemical preparations, on the most economical scale. As I conceive that the student will most effectually perform those experiments, which he has seen performed by others, and perhaps also, feel more deeply interested in them, I will describe the mode of preparing and repeating those, which were introduced by Mr. Hemming, in his Lectures on Chemistry at the London Mechanics' Institution, taking your report of those lectures for my guide, and beginning with the first lecture you reported, page 27, No. 26.

Experiment 1. To shew that the bulk of alcohol and water, is less than the mean bulk of the two fluids.—Fit a tube of capillary bore, closed at one end, into a cork, which exactly fits the extremity of a tube four or five inches long, and half an inch wide. Pour water, coloured with ink or litmus in, until the large tube is half full, (the capillary tube will be quite full,) fill it gently with alcohol, invert it quickly, closing the aperture with the finger, and it will be seen that the compound is diminished in bulk, when the alcohol rises, by the fluid in the capillary stem rapidly sinking.

Exp. 2. To shew the heat evolved, by mixing sulphuric acid with water.—Mix four parts acid by measure, with one of water: the heat of the mixture will be near 300° Faht. A piece of phosphorus placed outside the glass will be ignited, or if a tube of ether be inserted, the ether will boil.

Exp. 3. To form a solid opaque substance with two invisible

gases.—Pour muriatic acid in one retort, and liquid ammonia in another: fit the necks of the retorts loosely, into the opposite ends of a glass tube, five or six inches long. The application of a warm hand, or the spirit lamp to the liquids, will liberate the ammoniacal and muriatic acid gases copiously: these unite, forming the dense compound, muriate ammonia.

Exp. 4. To produce extraordinary changes in the colour of liquids.—Bruise a nut gall, pour on it boiling distilled water, filter through blotting paper, add distilled water till the solution is nearly colourless. This is dilute gallic acid. Prepare a solution of sulphate iron, by adding hot distilled water to sulphate iron, filter the solution, and dilute it till quite colourless. When these solutions are mixed, they form an intense black liquid. Add sulphuric, nitric, or muriatic acid, the transparency is instantly restored. Liquid ammonia will as quickly restore the black colour, by neutralizing the acid.

Exp. 5. To form a dense red gas, by mixing two invisible gases.—Pour dilute nitric acid on clippings of copper in a retort, nitrous gas will be copiously evolved; receive it in a bottle filled with, and inverted over, water.* Prepare oxygen gas, by heating to redness manganese in the iron retort. Mix three volumes of the nitrous gas, with one of oxygen; the two colourless gases form the deep red fluid, nitrous acid gas.

Exp. 6. To form a solid mass of matter, by mixing two transparent liquids.—Make a solution of muriate lime, by adding dilute muriatic acid to unslaked lime; filter till transparent; add to this sulphuric acid; the solid compound, sulphate lime, is formed.

Exp. 7. To detect the most prevalent impurities in water.—To detect copper, add liquid ammonia; a blue colour results. For lead, add a few drops of a solution of sulphate soda, (Glauber's salts,) or liquid sulphuretted hydrogen: the former produces a white precipitate; the latter, a black. The liquid sulphuretted hydrogen is prepared, by pouring on sulphuret of iron or antimony in a retort, dilute muriatic acid; apply a lamp, and sulphuretted hydrogen gas is liberated; receive this in a bottle filled with distilled water, and inverted over a bason of water; agitate the water with the gas frequently, that it may absorb more. Iron is detected by solution of gallic acid, or prussiate of potash. The gallic acid produces a dense black colour; the prussiate potash a vivid blue. The solution of prussiate potash is made by pouring boiling distilled water on prussiate potash.

In my next, I will describe the mode of performing the other experiments, contained in your report of Mr. Hemming's lecture.

I am, Sir,

Your obedient servant,

A MEMBER OF THE LONDON MECH. INSTITUTION.

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* The residue in the retort is solution of nitrate copper, exceedingly useful in experiment, and must be preserved. To crystallize it, pour it in a saucer, and apply heat, till a pellicle is formed on the surface.

SCIENTIFIC INSTITUTIONS.

ROYAL INSTITUTION.—The Lectures and Meetings of this Institution, which have been suspended for a short time during Easter, are resumed.

On Tuesday, 15th April, PROFESSOR MILLINGTON commenced a course of Lectures on the *Manufacture of Fabrics*.

Thursday, 17th, MR. REINAGLE commenced a course of Lectures on *Painting and the Fine Arts*, to be continued weekly.

Friday, 18th, DR. HARWOOD commenced a course on the *Natural History of Fishes*.

Saturday, 19th, MR. FARADAY commenced a course on *Chemical Manipulation*.

Each of these courses to be continued weekly till completed.

LONDON MECHANICS' INSTITUTION.—On Friday, April the 12th, DR. BIRKBECK delivered a very interesting Lecture on some *Peculiarities in the Action of Air and Steam Valves*, in which he introduced and explained the experiments made by Clermont and Desormes, who first observed that steam, when compressed in a boiler, and issuing in a violent jet through an orifice made in a pretty large plate, if a flat disk of metal be presented to it at a little distance from the orifice, strongly repelled it; but if it be brought near and placed against the plate, as if to close the orifice, although the steam issues on all sides, and presses against the disk more than before, not only is the disk not driven away, but it is kept nearly close to the plate by the pressure of a column of air, which rushes down with considerable force to supply the place of the air carried away with the current created by the lateral issue of the steam out between the plate and the disk.

At the conclusion it was announced that DR. BIRKBECK would deliver a Lecture on the *Construction of Chimneys*, and the means of obviating the employment of *Climbing Boys*.

MR. HEMMING'S FIFTH LECTURE ON CHEMISTRY.

HYDROGEN.

Mr. Hemming stated that the existence of hydrogen on a compound of hydrogen must have been known at an early period of time to those who witnessed the evolution of a certain inflammable vapour from the earth in certain situations. Van Helmont distinctly asserted the existence of this gas, which he called unctuous or inflammable gas, although he did not procure it in its separate state. It is unquestionable that Hales procured it, although he did not attentively examine it. Hydrogen was first distinctly obtained by Cavendish in the year 1776. The lecturer then described the various modes of procuring it by decomposing water from which alone it can be procured. The vapour of boiling water was passed through an iron tube inserted in a furnace; one extremity of the tube communicated with the pneumatic trough. Some turnings of iron were placed in the tube, and when these were at a red heat they decomposed the vapour combining with its oxygen and liberating its hydrogen. It was also procured by pouring dilute sulphuric acid in a retort containing zinc; and by the galvanic decomposition of water in two tubes, Mr. Hemming also decomposed a portion of water by passing it into a tube filled with mercury, and inverted over the same fluid, and thrusting through the mercury a piece of potassium, till it came in contact with the water. The

potassium instantly combined with the oxygen, and liberated hydrogen, the other component of water, which was inflamed by the application of a taper.

The lecturer then stated the various bodies which combined chemically with hydrogen, and the compounds they formed. It is the lightest of ponderable substances,—100 cubic inches weigh 2,118 grains; its specific gravity taking atmospheric air as the standard, is 0,0964. To show its levity a glass was filled with it, and held upright for a few seconds; on applying a lighted taper no inflammation occurred, consequently the gas had ascended. The glass was again filled with the gas, and held a much longer time in an *inverted* position, it immediately inflamed when the taper was applied. To prove that it was not a supporter of combustion, Mr. Hemming inverted a receiver filled with it over a lighted candle, the gas was ignited at the surface of the receiver, but the candle was instantly extinguished; by withdrawing the vessel slowly the candle was re-lighted. The slight detonation that occurred in this experiment and the last, arose from the hydrogen being mixed with atmospheric air. When pure hydrogen is ignited it burns silently with a lambent flame; but if mixed with an excess of air it detonates loudly. To show this, some pure hydrogen was passed into soap-suds, and inflamed; it burned silently, a mixture of air and hydrogen was ignited in the same manner, and produced a loud report.

In consequence of the extreme levity of hydrogen gas, its use in aerostation was first suggested by Dr. Black. He filled light and thin bladders with it, they were, however, found too heavy, but when the gas was passed into soap suds through a tobacco pipe, the bubbles thus blown ascended rapidly. Mr. Hemming explained fully the principle of pneumatic pressure, and the cause of the ascent of bodies specifically lighter than the medium in which they move. This was illustrated by the ascent and descent of a glass balloon in a vessel of water, which by compressing the air on the surface of the water was alternately rendered specifically heavier and lighter than the fluid. The experiments of Montgolfier on a silk bag filled with rarefied air were detailed, and a model of the Montgolfier balloon was filled with rarefied air by means of a sponge dipped in spirits of wine, and liberated, when it ascended with great rapidity to the cieling of the theatre. After some interesting observations on the most celebrated aerial voyages, Mr. Hemming introduced an elegant model of a balloon, with net-work and car, which had been constructed for the illustration of his lecture by Mr. Green, jun. and presented to the Institution. It was filled with hydrogen, and a string being attached to its car, it was liberated and ascended rapidly to the roof of the theatre. The lecturer concluded by stating, that he had entered more fully into the subject of aerostation than was usual in a lecture on hydrogen, that he might endeavour to do justice to the kindness of Mr. Green.

Southwark Literary and Scientific Institution.—The following Lectures have been delivered in the Institution.

Mr. Peake, on the *Powers of the Human Mind.*

Mr. Hemming *on Chemical Affinities.*

Mr. Dufief, a very interesting Lecture, *on the new System of acquiring Languages.*

Dr. Epps, will commence a Course of four Lectures *on Phrenology.*

MISCELLANEOUS INTELLIGENCE.

New Volcano.—It is stated on the authority of the French consul at Tifflis, that a new volcano has burst out near Baku. It was preceded by a violent tempest. In the morning was heard, about four leagues to the north-west of the town, a noise resembling that of cannon, and soon after a column of fire of extraordinary height appeared in the air, and continued burning for several hours. It then disappeared or rather shrunk into a small flame, rising about two feet

above the surface of the earth, and covering a space of about 450 ft. broad by 600 long. This irruption continued for about 24 hours, and was accompanied from the beginning by subterranean noises resembling thunder, while large stones and columns of boiling water were hurled into the sky. At the end of that time it ceased, and the crater closed up; but the fire still lingers in the soil, and the flames burst up whenever the earth is disturbed. It is well known that the Ghebres have a fire temple near this spot, where the eternal fire is still nourished; but it seems that the relics of the volcanic flames, which are red and odourless, in no respect resemble the Ghebres' fire. —*London Weekly Review.*

New Material for Paper.—According to the French papers, M. Julia Fontenelle, has established a manufacture of paper, from liquorice root. It is said to be very white, to require no sizing, and to be manufactured at a price much less than made from rags.

Method of attaining the Figure of a Plant—.A piece of paper is to be rubbed over with powdered dragon's blood, in the manner practised by engravers, and then the small branch or leaf, of which the design is required, is to be laid upon it; by means of slight friction, it soon takes up a small quantity of the powder, and being then laid upon moistened paper, an impression is to be taken in the manner practised for lithography without a machine. This process may be carefully employed for preserving certain physiognomical and characteristic features, which cannot be retained by drying the plant.

March of Intellect.—A weekly newspaper was last week to be issued at New Echota, in the Cherokee nation, to be called *the Cherokee Phœnix*. A part of the paper is to be printed in the Cherokee language, according to an alphabet lately invented by a native Cherokee.

LIST OF EXPIRED PATENTS.

Continued from page 288, Vol. I.

LIQUOR COCKS.—To William Stocker, of Marteck, Somerset, for an improved liquor cock. Dated January 10, 1814.

CALICO PRINTING.—To John Duffy, Jun., of Ball's Bridge, near Dublin, for a method of defending mordants from the action of acids, &c. in producing various patterns on cloth. Dated February 8, 1814.

PAPER HANGINGS.—To Timothy Harris, of Foley Place, Portland Chapel, Middlesex, for machines for laying on the colour upon paper, linen, leather, &c. Dated February 8, 1814.

REFRIGERATORIES.—To John Vallance, Jun., of Brighton, for an apparatus for cooling liquors. Dated February 8, 1814.

FLAX.—To John Kershaw, of Glossop Dale, Derbyshire, for a mode of preparing flax for spinning. Dated February 10, 1814.

DRY ROT.—To Joseph Bramah, of Pimlico, for a method of applying a certain species of earth, to prevent the dry rot. Dated February 10, 1814.

OPTICAL INSTRUMENTS.—To W. F. Hamilton, of Asylum Buildings, Lambeth, for improved optical instruments. Dated February 12, 1814.

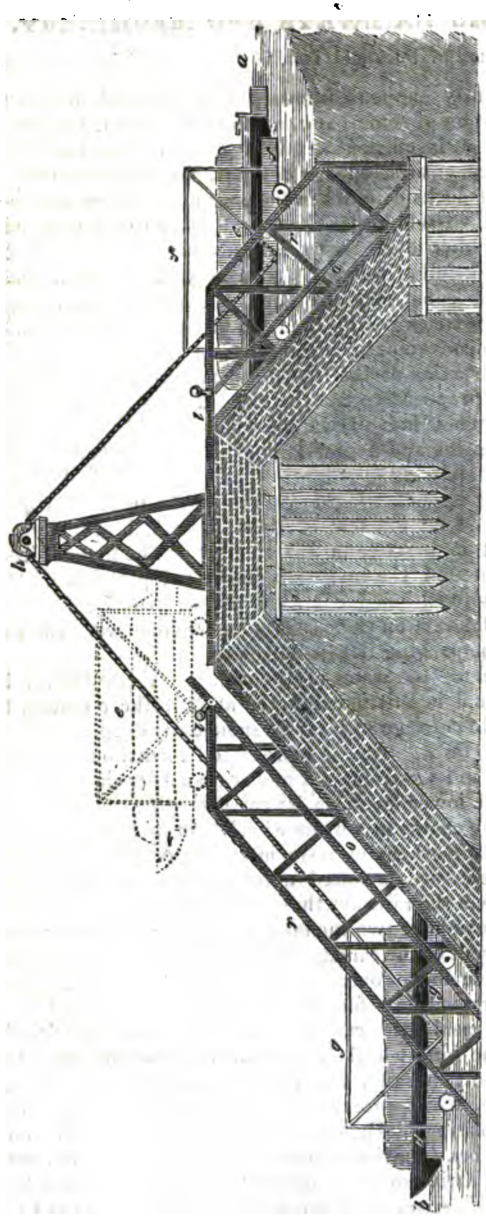
COOKING APPARATUS.—To Richard Price, of Bristol, for an improved apparatus. Dated February 12, 1814.

STOVES.—To John Buddle, of Wall's End, Northumberland, for an improved stove for burning coals. Dated February 21, 1814.

TO OUR READERS AND CORRESPONDENTS.

Delta's Paper on the Comparative Advantages of Hague's Patent Pneumatic Crane and the Common Crane in our next.

P. P. does not suit our publication.



UNDERHILL'S PATENT MACHINERY FOR PASSING BOATS & OTHER FLOATING BODIES

FROM A HIGHER TO A LOWER, AND FROM A LOWER TO A HIGHER LEVEL, WITHOUT LOSS OF WATER;

AND FOR RAISING AND LOWERING WEIGHTS ON LAND.

PATENT CANAL RAILWAYS AND MACHINERY,

By John Underhill, of Packfield Iron Works, near Wolverhampton.

It not unfrequently happens in many lines of canal, owing to leakage, the destruction of some bank, a long dry season, and other causes, that there is an insufficient depth of water to float the laden vessels, occasioning an entire stoppage of the traffic for a considerable time. The utility of locks consists in keeping up the great body of water, and enabling vessels to pass from a higher to a lower, and from a lower to a higher level; but these advantages are attended with the loss of a lock-full of water at the passage of each boat; and when these transits become very numerous, the loss of water occasioned by them is sometimes greater than can be supplied in due time. To remedy these inconveniences, and obviate the great expense incurred in the construction of the common canal locks, many contrivances have been proposed to transfer the laden vessels from one level to another without loss of water; such as solid plungers in parallel chambers, raising and depressing boats in frames or caissons, suspended by chains, passing over large wheels, and worked by air vessels; the drawing up or letting down the boats in cradles over inclined planes, &c. &c.: but few of them have hitherto, to our knowledge, been put in practice in this country. The plan of Mr. Underhill, the patentee of the invention before us, partakes of the character of the last-mentioned contrivances, as will be seen on examination of the diagram on the other side, together with the explanation of the accompanying letters of reference.

a the higher level of the water of the canal; *b* the lower level; the bottom of the canal is a little excavated at both these places, to admit a kind of cradle carriage to be sunk sufficiently deep for a boat to be floated on to, or off it. At *c* is represented a laden boat, placed upon the upper level in its carriage *ff*, and at *d* another similarly circumstanced upon the lower level, in its carriage *g g*; each of them are attached by strong chains to a drum wheel *h*, properly mounted in a strong framing, and worked by a steam engine or other adequate power. The carriages are mounted upon two pair of solid iron wheels, which run upon the railways that connect the upper and lower levels. These railways have two inclined planes, for the ascent, and the same for the descent of the carriage and boat on the opposite side, with a horizontal plane above communicating with both slopes. This will be clearly understood on reference to the diagram. The boat *c* is there represented inside the carriage, and ascending the double rails or planes *r*, the hind wheels being on the top rails, and the fore wheels on the bottom rails, but confined in their track by the parallel bars *o* above, which preserve the carriage from shifting out of the horizontal position. Before arriving at the top, the fore wheels open two latches *l*, having counterbalance weights, and both hind and fore wheels arrive together on the top of the horizontal line of rail; on drawing it forward for the descent, into the lower level of the canal, the latches *l* become closed, and the carriage is sent

forward, as shown at *e* in dotted lines, before descending; when the fore wheels open the latches for the hind wheels to enter between the parallel bars; *g g* shows the boat and carriage delivered on to the lower level of water, where the carriage sinks to a sufficient depth to allow the boat to float away from it.

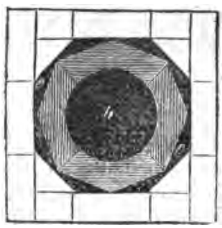
From the foregoing it is obvious, that one boat by its descent may cause another boat to ascend on the opposite side, with but little increase of force.

The patentee proposes to employ his machinery for raising weights on land.

PATENT CHIMNEY FLUES AND TUNNELS.

By J. W. Hiort, Esq. of the Office of Works, Whitehall.

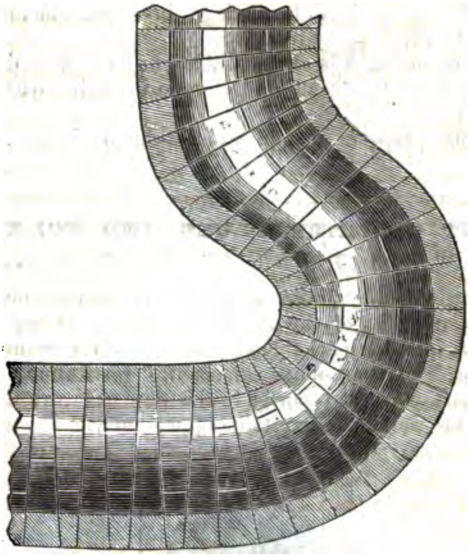
In our third volume, first series, we gave a brief notice of this patent, but the utility of the invention seeming to require a more particular description, especially as elucidatory of the lecture delivered by Dr. Birkbeck at the London Mechanics' Institution, on Friday, the 18th instant, which is reported in the 92nd page, we have availed ourselves of the present as a suitable opportunity.



Within the usual thickness of walls, and incorporated with the common brick-work, circular smoke-flues or tunnels (as seen in the annexed plan or horizontal section at *b*) are built of any given diameter. Each flue or tunnel is surrounded in every direction, from bottom to top, by cavities or warm-air chambers *c c*, commencing at the back of every fire place, and connected with each other. The air confined within these chambers, by the heat of any one fire, is said to be rendered sufficiently warm to prevent condensation within all the flues contained in the same stack of chimneys. These flues or tunnels are erected without difficulty, may be carried to any extent, either perpendicularly or horizontally, and can be adapted to every possible bend or turn, without producing any internal angles.

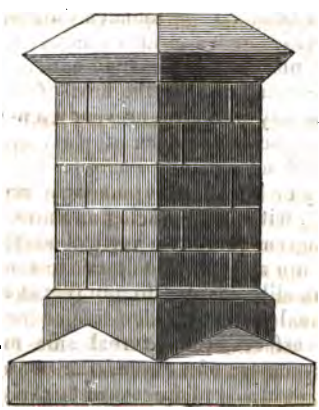
The following diagram exhibits a vertical section of a portion of a circular flue, bent into a serpentine figure, to show that the newly-invented bricks are readily adapted to any required curvature. The figure of each individual brick is wedge-like or inclined, as respects its upper and lower surfaces, the external side forms a very obtuse angle, the internal is the arc of a circle, the two ends of each brick are cut into planes, which radiate towards the centre of a circle,

which circle is completed by placing four bricks together end to end, as shown in the foregoing plan: their inclined figure is best shown by the annexed cut.



To make the flue straight, it will be observed that the thick ends of one course of bricks are placed alternately upon thin ends of the next course; and in order to make curves the thick ends are placed together on one side, and the thin ends on the opposite side.

The circular flue commences at the throat of the chimney below the usual line of the chimney bar, and immediately over the fire, and continuous to the top, represented in the subjoined elevation.



From below the chimney bar the flue is continued downward to the hearth in a half circle, forming the centre of the back of the fire-place.

The usual filling in brick-work in setting stoves, by this means becomes unnecessary, and the angles within the fire-place may be altogether avoided. Thus the throat of the chimney is made to contain no more air than can be heated by the fuel ordinarily consumed, nor can the air of the room or chamber connect with that of the chimney without passing through or coming in contact with the fire; and should the upper part of the flue admit of a counter-current of descending colder air, it must, at a certain point, become rarefied, and return with the centre spiral column of ascending smoke and heated air. The flues in question are particularly applicable in instances where the fire-places are necessarily formed under windows.

In building these flues or tunnels, no other material is used than the patentee's newly-invented bricks, and the cement by which they are united. These bricks require no labour in cutting, being made on systematic principles, and when applied to the purposes intended, the joints, both horizontally and vertically, are as those of an arch, and therefore capable of resisting great external pressure; and the rim of the flue being in two thicknesses, the interior is essentially protected from any injury to which the outside facing of the wall may be liable, by plugs driven into the mortar-joints by carpenters, &c.; the course of each flue being also denoted by a stamp or mark on the front of every brick.

From the construction of these chimneys or flues, and the nature of the materials of which they consist, no danger need be apprehended should the soot ignite, (an accident not very likely to happen,) for such an accumulation of soot as common chimneys are liable to, cannot take place within these tunnels, there being no angles in which the soot can lodge, the draught of air through them being much stronger, and the necessity for cleansing them rendered less frequent, by vitrifying the insides of the bricks, to prevent adhesion; nevertheless, the operation of cleansing may with facility be performed when needful, without the aid of climbing boys, all sharp angular turns, and other impediments, which have hitherto prevented the use of machinery, being totally avoided.

PATENT FOR PREPARING INFLAMMABLE GAS.

By J. H. Ibbetson, Esq. of Chelsea, Middlesex.

The chief peculiarity of the patentee's process for preparing inflammable gas, is a mode of decomposing water, in conjunction with coal, and in the construction of a furnace adapted to that purpose. The accompanying figure represents a vertical section of the apparatus employed. In the central compartment at *a* is an iron door and frame opening above the fire-place, for supplying the fuel thereto; immediately under the arched top of the fire-place, at *b* is a small aperture for the admission of the air requisite for the combustion of the fuel; for the purpose of lighting the fire, there is another small

door shewn by the dots at *c; d* is the ash-pit; *e e e e* is the flue, which descends and then takes the course pointed out by the direction of the arrows to the chimney, thus entirely enveloping the decomposing chamber *g*, which occupies the space included between the flues and the central furnace.

The coals or other substances to be decomposed, are introduced through an iron door *h*; this door, as well as two other doors *l l*, (shewn by dotted lines), for extracting the coke, are kept closed air-tight, by luting during the process of distillation; and for clearing out the ashes under the gratings, there are apertures at *i i*, fitted also with doors and kept closed like the last mentioned, whilst the decomposition is going forward within.

The steam is introduced at two places in the decomposing chamber; one at *f* by an open pipe of retort earth, from whence it ascends among the ignited coke, passing round the chamber in the direction shewn by the arrows; the other at *k*, where a tube of retort earth is extended across the chamber horizontally, the steam escaping from it through numerous small holes at the bottom and sides. The gases and vapour produced by these combined circumstances, make their exit by a pipe at *o*.

By this apparatus the patentee also professes to decompose tar and oil along with coal; in which case, those fluids would be introduced on the right hand side (opposite to *k*,) by means of tubes, regulating

the quantity by means of stop-cocks, which should, of course, never be more than will become decomposed whilst circulating through the burning coal, without reaching the bottom of that side of the chamber where it enters.

The patentee observes, that the coals should be broken into pieces (not exceeding) about the size of walnuts before they are put into the decomposing chamber, and that the charges should be made from time to time, by fresh layers of one inch and a half in thickness, after the previous charge has become perfectly red hot.

TYPES FOR THE BLIND.

The Gold Vulcan Medal of the Society of Arts has been presented to Mr. G. Gibson, of Birmingham, who, being himself blind, has invented a set of types, whereby he can write down his thoughts, perform arithmetical operations, and communicate the results of them not only to those who can see, but to persons labouring under the same privation with himself. His apparatus consists of a number of cubes, on the top of which are formed, in relief, sufficiently high to be distinguishable by the touch, the figures of the letters, of the numerals, and of other characters that he may have occasion for. On the bottom of each cube, the figure that it bears on the top is represented by needle points, projecting about a tenth of an inch. If, therefore, a piece of paper be laid on a hard flat cushion, and one of the cubes formed, as above described, be pressed upon it, the points will penetrate the paper, and will form on the under side a visible, and at the same time a tangible representation of the figure, by means of the burs or prominences wherever the points have passed through.

NEW METHOD OF TRUSSING GIRDERS.

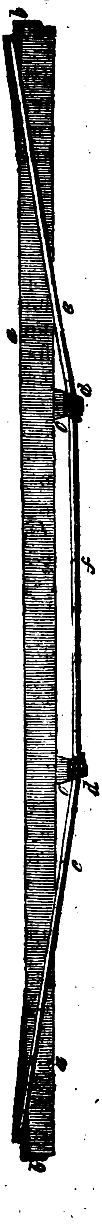
By Mr. Joseph Conder, of Upper Thames Street.

In our last number, we described a plan for taking advantage of the cohesion of metal in the construction of carriage wheels in the patented invention of Mr. Theodore Jones; and we have on the present occasion to lay before our readers a very important application of the same principle to architectural purposes, in trussing girders, bressumers or other beams, where stability, lightness, and durability, are objects with the builder.

For the accompanied sketches of this truss, we are indebted to Mr. Joseph Conder, a member of the committee of management of the London Mechanics' Institution. We have already intimated, that the members of this society, are in the habit of holding weekly meetings for the familiar discussions and the mutual communication of information.

On Tuesday last Mr. Conder introduced and explained to a large assemblage of his fellow members, a model of a trussed girder, on the suspension principle, of which the annexed diagram fig. 1 is a representation. Figs. 2, 3, 4, 5, represent separate parts of the plan of trussing, and the same letters refer to similar parts in all the figures.

Fig. 1.



The girder or beam is distinguished by *a a*, fig. 1, furnished with cast-iron plates *b b*, turned down at right angles to extend over its ends. These end plates have on their upper surfaces circular hooked projections, shewn in elevation by fig. 2, and in plan by fig. 3, the use of these hooked projections is to receive round rods of malleable iron, bent in the middle to correspond and fit into the hooked projections, as represented by *b*, fig. 3.

The iron rods extend along each side of the girder, one-third of its length in a sloping direction from *b* to *d*, where their ends pass through holes in cross pieces of iron, and are secured by screwing thereon nuts as shown at fig. 4. Between the pieces *d d* and the lower side of the girder are placed prism-shaped blocks of oak *c c*, shown in section by fig 5, which vary in size according to the depth of the roof or floor which the girder is intended to support. Below the middle of the girder and parallel thereto extends a single rod *f*, equal in strength to the double rod *e e*; this rod passes through the middle of the cross pieces *d d*, and is secured by nuts screwed on its ends as represented by fig. 4. All the parts of this truss may be brought to any required tension, and the girder made to camber, simply by screwing up one of the nuts on the rod *f*.

The advantages which Mr. Conder proposes to obtain by his suspension truss, are greater strength with a less quantity of material, and, consequently, with less weight, and greater economy in construction, with greater facility in its application than can be obtained by the usual method of trussing. These are matters of no inconsiderable importance, as it is the weight of the materials which determines the limits of the span to which trussed girders can be applied. In the usual method, where two principals or end pieces extend from the ends of the girder upwards in a sloping direction, each to one-third of its length,

Fig. 2.

Fig. 3.

Fig. 4.

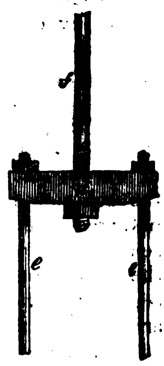
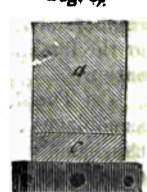


Fig. 5.



where they butt against the ends of a middle or crown piece, extending parallely along its middle, and are secured down to the girder at the joinings by queen bolts, it is absolutely necessary that the several parts should possess sufficient strength, not only to resist the tendency to their being crushed by the load put upon them, but the far greater tendency to bend by the end pressure which they have to sustain: and to counteract this tendency to flexure, which in great lengths, is very considerable, requires so much additional material as to increase greatly both the weight and the expense.

A bare inspection of the engravings will sufficiently show the facility with which the suspension truss can be applied; for instead of having to slit open the girder to admit the principals, and to cut it away near the ends to admit the abutment pieces, which according to the usual method require to be let into the timber, and to be firmly secured with bolts, all that is necessary is to put in their respective places the several parts of the suspension trusses, and to secure them there by tightening the screws; for no cutting into the girder is required, nor are any bolts or nails wanted to attach the iron to the timber.

Mr. Conder is not ignorant of small wooden bridges having been strengthened, as well as iron ones constructed, upon the suspension principle; but this does not at all detract from his merit in introducing the above application, nor from his liberality in laying his plan freely before the public.

AN INQUIRY INTO THE POWER OF
HAGUE'S PATENT PNEUMATIC CRANE.

TO THE EDITOR.

Sir,—In the twenty-sixth number of your Register, is a description of a crane upon a novel principle, which is at work at the St. Catherine's Docks, but no estimate is given of its power, in comparison with those in common use; and as the value of the machine must depend in a great measure, upon this, I hope the following attempt to calculate the proportion between the power employed and the effect produced, will not be unacceptable to your readers.

In cranes of the description alluded to, the air in the working cylinder is rarefied on one side of the piston, whilst the atmosphere presses on the other side, until the pressure of the atmosphere equals the load which is connected with the piston, and upon further exhaustion of the air the piston is put in motion, and raises the load. The rarefaction of the air in the working cylinder is produced by two pumps, and the power required to work the pumps will depend upon the degree of pressure required to move the load, but as the weight of the loads will vary, the power employed to work the pumps must be sufficient to produce the greatest pressure that can be required; to estimate this power, I shall suppose the greatest pressure required to be 88 parts of the whole pressure of the atmosphere, (i. e.) supposing the atmosphere to press with a force of 100 lbs. on the piston, with a perfect vacuum beneath it, then the greatest load that will be required to be raised, shall not exceed 88 lbs. Let the working

cylinder be connected with a double-barrelled pump, each barrel being equal to $\frac{1}{5}$ the cubic contents of the working cylinder, then a pressure of 88 lbs. being obtained, the ascending piston will be opposed by 88 lbs., through the whole stroke, the descending piston at the commencement of its stroke, is pressed by a like force, but which gradually decreases, and when it has completed 88 parts of its stroke, the pressure wholly ceases; the pressure therefore on the descending piston has been 44 lbs. through $\frac{88}{100}$ parts of the stroke, or 39 lbs. through the whole stroke, this subtracted from 88 lbs., the pressure upon the ascending piston, leaves 49 lbs. for the force required to work the pumps.

Taking the foregoing calculation as correct, the following statement shews the effect of the machine, with four different loads, marking the space passed over by the load, and by the moving power, and distinguishing the power expended in rarefying the air from that which moves the load.

	lbs.		strokes,	rarefaction, load,			loss.
power	49	×	13	(viz. 3 + 10)	=	637	367
load	27	×	10			270	
power	49	×	15	(5 + 10)	=	735	325
load	41	×	10			410	
power	49	×	20	(10 + 10)	=	980	340
load	64	×	10			640	
power	49	×	30	(20 + 10)	=	1470	590
load	88	×	10			880	
Total power	49	×	78			3822	
Total effect	220	×	10			2200	
Total loss						1622	

With a crane of the common construction raising the same loads, with constant power equal to the greatest load, viz. 88 lbs., the effect will be as follows:

	power	88 lbs.	through	10	=	880		loss.
1	load	27	....	10	=	270	—	610
2	load	41	....	10	=	410	—	470
3	load	64	....	10	=	640		270
4		88	....	10	=	880		
	Total load	220	....	10	=	2200	—	1320
	Total power	88	....	40	=	3520		
								1622
								302 difference

in favour of the common crane.

The above calculations are entirely theoretical, friction and imperfections of workmanship, &c. not being considered in either case; but if the calculation is correct, it is clear that the loss of power is greater on the new principle, than on the old; how far this may be compensated in practice, by the advantages ascribed to it by your correspondent J. M. I am unable to decide. Your's, DELTA.

COMPARATIVE VIEW OF

FOREIGN AND BRITISH MACHINERY,

AND PROCESSES IN THE ARTS.

CEYLON, N°. XIII,—[continued from page 800, Vol. I. N. S.]

Many of the domestic implements of the Singalese have been described in the previous papers on this subject, in our last volume. Their kitchen apparatus, besides a few baskets, and various coarse earthenware vessels, consist principally of the following. A mortar and pestle for pounding rough rice, (described at p. 80, vol. i. N.S.); a stone hand-mill for grinding grain, (ibid page 91); an apparatus for the expression of vegetable oil (ibid p. 107.)

The preparation of *curry* is an object in which the culinary skill of the Singalese is much exercised. The common kind is said to consist of red pepper, salt, lime-juice, and the dried skin of the gorka. But they have one of superior quality, which the more learned gastronomists thus direct the preparation of:—a piece of green ginger, two cloves of garlic, a few coriander and cummin seeds, six small onions, one dry chilly or capsicum, six or eight corns of pepper, a small piece of turmeric, half a dessert spoon of butter, half a cocoa-nut, half a lime.

As the foregoing recipe is somewhat extraneous to our legitimate object in this paper, we shall just add that we have been prompted to give it insertion, from having noticed the extravagant cost of the *foreign* curry, which may evidently be easily and cheaply imitated at *home*.

In the preparation of their curry the Singalese employ a *heromané*, which is a circular iron rasp fixed into a wooden stand. It is used for reducing the ripe cocoa-nut to a minced state, as an ingredient of the curry. They use also a couple of smooth stones, one small and the other large, for mixing together intimately, and grinding finely all the ingredients.

The chewing of *betel* is a practice indulged in almost constantly, by all classes of Singalese, of either sex, and is, indeed, considered quite indispensable. What is called *betel*, is a variously compounded masticatory; it most commonly consists of betel leaf, areka nut, quenched lime, tobacco, and catechu: in the preparation of it two instruments are used.

The girri, (fig. 1) for cutting the areka nut, and the wanggadi and moolgah, a kind of mortar and pestle, (fig. 2) for mincing and

Fig. 1.

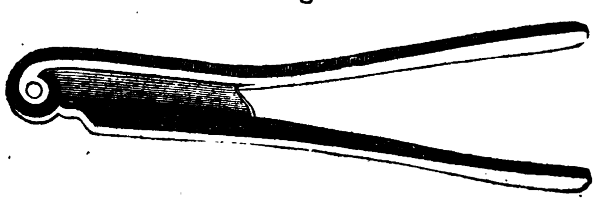
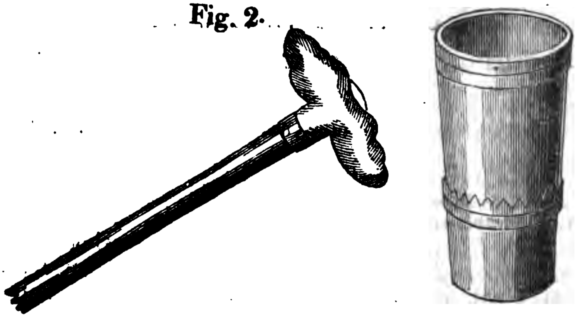


Fig. 2.



mixing intimately the ingredients together. The boxes of the higher ranks of people, in which the materials are kept, are generally of silver, and very handsomely wrought.

[*To be continued.*]

SCIENTIFIC INSTITUTIONS.

Royal Institution.—It has been announced to the Members of this Institution, that Dr. Edmund J. Clarke, will commence a short course of Lectures on *Botany*, in the second week in May.

London Mechanics' Institution.—Friday, the 18th of April, Dr. Birkbeck delivered his Lecture on the *Construction of Chimnies and mode of sweeping them.*

DR. BIRKBECK'S LECTURE ON THE CONSTRUCTION OF CHIMNIES, AND THE MECHANICAL MODES OF SWEEPING THEM.

Dr. Birkbeck stated that unavoidable circumstances had prevented an earlier redemption of the pledge, which he had made several months since to the society, for superseding the necessity of climbing boys, to deliver a lecture on the subject of mechanical chimney sweeping, and to prove its possibility, in almost every variety of construction in flues. After some appropriate and forcible observations, on the inhumanity of employing children of tender age, in the cruel and disgusting employment of chimney sweeping, the lecturer observed that independent of the gratification which the philanthropist must experience, who devised the most successful means of abolishing this odious practice by the introduction of mechanical apparatus, a large pecuniary reward would be allotted. A benevolent lady, Mrs. Elizabeth Denyer, bequeathed in her will, dated August 16th, 1821, the sum of Two Hundred Pounds, in the 3 per cent. consolidated annuities, to the individual who should be so successful in the construction of machinery for sweeping chimneys as to lead to the abolition by parliament, of the practice of employing children for that purpose. The following is an extract from Mrs. Denyer's will, containing the exact words of the bequest.

Extract from the will of Elizabeth Dennis Denyer, formerly of Chelsea, Middlesex, afterwards of Dulwich, in Surrey, and now of Mecklenburg Street, in the said county of Middlesex, dated 16th August, 1821.

"*I give to the treasurer for the time being, of the Society for preventing the use of Climbing Boys as Chimney-sweepers, the sum of Two Hundred Pounds stock in the consolidated 3 per cent. annuities, and I will that the said principal*

sum in stock shall be given by the treasurer or trustees of the said society for the time being, by way of reward, to any person who shall invent or bring to perfection any machine which shall be approved of by parliament, and which shall thereby prevent the use and employment of climbing boys for sweeping chimneys. And in the mean time I will that the annual dividends and interest of the said Two Hundred Pounds stock shall be applied to the general uses and purposes of the said Society, or in any way that may conduce to the amelioration of the unfortunate boys so employed."

In pursuance of the said bequest, the sum of £200. 3 per cent. consolidated Bank Annuities, has been duly transferred into the name of the treasurer, applicable as above.

Dr. Birkbeck then proceeded to give an interesting outline of the history of chimnies, and of their general construction. Chimnies were wholly unknown to the Greeks and Romans: indeed it was not until the year 1347 that a regular flue or chimney was constructed. An historian of Queen Elizabeth's reign says, our ancestors had no chimnies; a hole in the ground sufficing for the fire-place; and a hole in the roof for the escape of the smoke; but now, says he, there are few gentlemen's houses without *one chimney at least*. A chimney is not indispensable to the ascent of smoke, as is well known. Smoke is composed of unconsumed particles of carbonaceous matter, which are borne upwards with velocity by the air which is heated and rarefied by the fire. To show the forcible ascent of heated air, a lamp was placed under a long piece of card cut in a serpentine form, and suspended from a rod; the ascending air caused it to revolve with considerable rapidity. The lamp was then placed under a long cylindrical tube, to the upper extremity of which was attached a cap, with vanes, similar to those of a common ventilator; this also revolved by the current of hot air with great rapidity. To illustrate the principle on which a fluid of inferior specific gravity rises in one of superior gravity, a bottle of coloured turpentine was lowered in a tall glass jar full of water, the stopper was withdrawn by means of a string, and the coloured turpentine ascended to the upper extremity of the jar through the water, in a stream similar to the column of smoke issuing from a chimney into the air.

An eminent writer has said, that there are three things in which every man considers himself skilful, viz. politics, physic, and the art of mending a fire; to which may be added a fourth, that of curing a smoky chimney; for almost every one knew of some means by which this, *one of the great evils of life*, might be remedied; the *other great evil*, it was humourously observed, formed no part of the subject to be considered. The absurdity of the general mode, however, of remedying a smoky chimney, by adding first one pot, and then another, and another, with a cowl or ventilator at the top of all, was exposed with great force and humour.

Climbing boys were first introduced at Piedmont and Savoy, and the dimensions of the chimney were fixed at 14 inches by 9, that the *human brush* might ascend with facility. The great muscular exertion of the boy to ascend, and the inevitable laceration of the back and knees in the task were explained with much feeling and effect; and the danger of suffocation by the accumulation of soot in those chimnies that have nearly right angles were rendered very obvious.

Dr. Birkbeck then proceeded to introduce some of the best modes hitherto adopted to obviate the necessity of employing boys in chimney sweeping.—Mr. Hiort had obtained a patent for making bricks of a peculiar shape, by which the flue would be rendered circular. This patent invention is described at page 83. Circular flues are cleansed by a machine with much greater facility and effect than the ordinary square flues. Mr. Hiort's bricks are generally glazed inside to prevent the accumulation of soot, and their inclined shape enables the builder to turn the flue in any direction. The circular flue is surrounded by bonding bricks, which leave a space for air between the chimney and the wall. The air becomes heated, and by keeping the flue at a high temperature greatly facilitates the ascent of the smoke. A very sensible and well written letter, addressed to Dr. Birkbeck from Mr. Ward, was read,

in which that gentleman recommended the introduction of circular flues, similar to those of Mr. Hiort, but of cast iron.*

Dr. Birkbeck then introduced the apparatus employed by Mr. Glass for chimney sweeping, which having been described in No 11, in a communication from the philanthropic secretary of the society, for superseding the necessity of climbing boys, we shall not here repeat. Another apparatus by Mr. Glass was, however, exhibited, which differed from the former in having a spring socket joint, which was more quickly adapted than the screw joint. The first idea of employing jointed rods for this purpose is due to Mr. Smart, the principal objection to whose apparatus, Dr. Birkbeck observed, was its expense, as it cost about *four times as much as a boy*. An apparatus, constructed by Mr. Barwick, was then introduced, which was much like that of Mr. Glass, with the exception that the cane rods were attached by a very ingenious kind of knuckle-joint secured by a cylinder, with a bayonet groove fitting to a stab. A similar apparatus, made also by Mr. Barwick, with a brush formed of steel wire, with a round steel jointed rod, for sweeping chimneys on fire was then introduced. The lecturer here took occasion to observe, that if Mr. Hiort's flues were adopted, the best mode of cleaning them would be to set them on fire, as no danger could accrue from it, A rough model of a contrivance of the Editor's of this work was next exhibited, which the lecturer considered as too flexible for the purpose.

Dr. Birkbeck concluded his interesting lecture by a powerful appeal to the public to discountenance the practice of sweeping chimneys by boys,† and to patronize those who employed machinery for this purpose, as it was evident that with very few exceptions indeed, this was sufficient, and where it was not the construction of the flue should be immediately altered.

At the conclusion of Mr. Peter Christie's second Lecture on *Architecture*, delivered on 23rd April, it was announced that Friday, April 25, Mr. Chapman would deliver a Lecture on *Imagination*, and that on the Friday following, May 2, Professor Millington would deliver the first of a short course of Lectures on *Hydraulics*.

City of London Literary and Scientific Institution.—A numerous Meeting of the Members and *Friends* of this Institution, was held on Friday, the 25th April, for the purpose of formally opening a New Lecture Room, recently built on the premises of the Institution, in Aldersgate Street, about 8 o'clock : an account of the interesting proceedings at which is unavoidably postponed.

Spitalfields Mechanics' Institution.—The business of this Society has been recently removed into rooms at No. 3, Wood Street, Spitalfields, in the House of Mr. Beck, who performs the duties of *Honorary Secretary*.

At a recent election of Officers, Thomas Gibson, Esq. was re-elected President, and Messrs. Hemming and Masterman were elected Vice-Presidents, in lieu of Dr. Mitchell, and Mr. Graham, retired.

College of Physicians.—On Monday evening, (14th instant,) the first of a series of evening meetings, was held in the elegant

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* About twelve months prior to Mr. Hiort's patent, it was proposed by I. H. in the Register of Arts, vol. ii. p. 188, to construct chimney flues of cylindrical pieces of pottery, with elbows and turnings of the same material, with the view of obviating all the evils that result from the present system.

† The Doctor might have added of *girls* also, as there have been many cases in which female children have been thus employed, or rather tortured. A master sweep, at Windsor, had several of his own daughters engaged as "human brushes," and his only excuse was, that he had no sons to supply their places.

rooms of the Physicians' College. The object of these meetings is to afford to men of science, an opportunity of meeting for the purpose of conversation, and the familiar discussion of matters connected with their pursuits. On this occasion, an interesting paper on *Tic Douloureux*, was read to the company by Sir Henry Halford. The rooms were fully attended by members of the profession, besides numerous distinguished individuals.

London College of Surgeons.—The president and council of this institution have lately presented a petition to the House of Commons, complaining of the disabilities which the medical students of this country labour under, from the want of a sufficient supply of human subjects for dissection, and the consequently imperfect nature of their education, which subjects them, should their ignorance prove injurious to patients, to legal punishment and loss of reputation.

MISCELLANEOUS INTELLIGENCE.

Motion produced by the contact of different substances. —If a very small drop of oil be placed upon a large drop of mercury it produces a greater or smaller extension in the latter. This phenomenon, with other similar ones, is attributed to a combination of the oil with the mercury, which produces a compound, the molecular attraction of which is less strong than that of pure mercury.

Inflammable Gas from Salt Works.—Whilst boring in search of salt at Rocky Hill, Ohio, about 1½ mile from Lake Erie, the auger fell at the depth of 197 feet; brine spouted out for several hours, and then a large quantity of inflammable air issued, which took fire and burnt the combustible things in the neighbourhood.—*Trans. Soc. of New York.*

Assamese method of Blasting Rocks. The Assamese close the mouth of the hole by driving in with a mallet a stout wooden plug some inches in length, through which a touch-hole is bored. Between the powder and the lower part of the plug an interval of several inches is left. The communication is perfected by means of a tin tube filled with powder, and passed through the centre of the plug.—*Monthly Magazine.*

A constant current of Inflammable Gas has issued for sixty years past from one of the pits in the salt mine of Gottesgube, at Rheine, in the county of Tecklingbourg, and sometimes gas issues from other parts of the works. It is said that M. Roeders, the inspector, collects this gas in old pits, conducts it to his house by tubes, and burns it for the purpose of giving light and heat. Its flame is said to be brilliant—its specific gravity 0.66. It contains only traces of carbonic acid and of sulphuretted hydrogen.—*Brewster's Journal.*

Explosion of a Coal Mine.—About a month ago in one of the mines of Serang, in the Netherlands, an explosion of inflammable

gas took place, when 47 persons lost their lives, besides which, many others were severely mutilated. The accident was caused by the miners incautiously breaking into an old work, which had long been in a foul state. The safety lamp is in use in the Netherlands; but the prejudice against it is even stronger than in our own mining districts.

INOCULATION WITH VEGETABLE SAP.—A gentleman in Herefordshire has (it is said) been making some successful experiments on the transfusion of the sap of young trees into old fruit trees, with the view of preserving them from decay. Young trees being planted in the vicinity of the old, with some branches of the former passed through the bark of the latter, cause the circulation of the sap in both to unite, and to reinvigorate the decaying tree.

HEAT EVOLVED DURING COMBUSTION.—In some papers on this subject lately read by M. Despretz, he states that hydrogen is the body of which a given weight gives out most heat, and the metals the least. But the result is of the opposite kind if referred to equal weights of oxygen. Carbon, which in burning does not alter the volume of the oxygen gas it consumes, produces three fifths of the heat evolved by the metals iron, zinc, and tin, which reduce the oxide to the solid state. Hence it is in the *act* of combination that we must seek for the principal cause of the developement of heat, and not in the approach of the particles. M. Despretz has also found that the quantity of heat developed by a certain quantity of a body, which burns without changing the volume of gas in the same, whatever be the density of the gas.—*Phil. Mag.*

LIST OF EXPIRED PATENTS.

Continued from page 80.

FIRE ARMS.—To James Jameson, of Islington, Middlesex, for improvements in fire arms. Dated March 9, 1814.

HYDRAULIC PRESSES.—To Matthew Murray, of Leeds, for improvements in the construction of hydraulic presses. Dated March 12, 1814.

LEATHER.—To Marc Isambard Brunel, of Chelsea, Middlesex, for a method of giving additional durability to leather. Dated March 12, 1814.

STEAM CLOSETS.—To James Sadler, of Birmingham, for an apparatus for steaming, washing, whitening, &c., cloth or clothes. Dated March 12, 1814.

AXLETREES.—To James Barclay, and William Cumming, of Cambridge, for improved wheels and axletrees for carriages. Dated March 12, 1814.

AIR-TIGHT STOPPERS.—To Edward Steers, of the Inner Temple, London, for a method of rendering the stoppers of bottles, jars, &c. air-tight. Dated March 12, 1814.

FIRE-SCREEN.—To Roger Haseldine, of Great Russell Street, for a folding screen, to be applied to fires, windows, and doors, to impede the passage of air, fire, &c. Dated March 12, 1814.

DRY-ROT.—To Alexander Cook, of the Strand, for an invention to prevent the dry-rot in wood, and to preserve linen and woollen cloth, from mildew. Dated March 12, 1814.

CRAPE.—To Daniel Goodall, of Barton Latimer, Northampton, for a method of manufacturing various kinds of crape. Dated March 12, 1824.

STEAM ENGINE.—To W. A. Noble, of Chelsea, for an improved steam and fire engine, and a new means of connecting steam pipes together. Dated March 23, 1814.

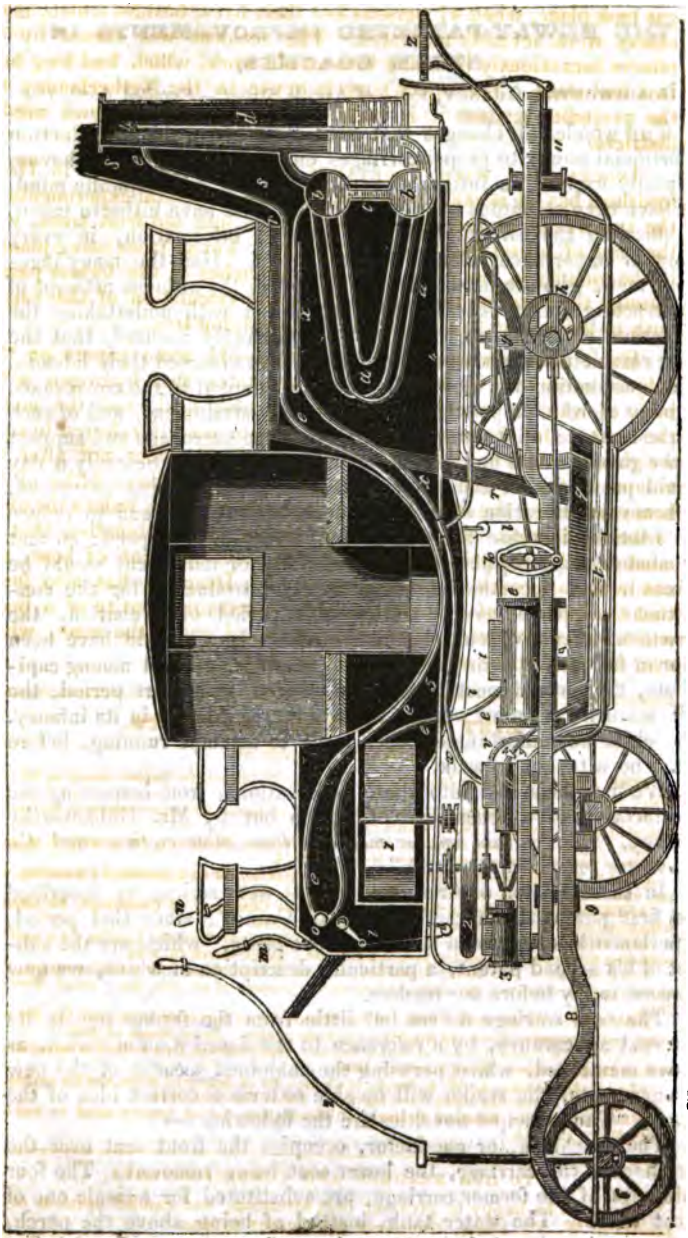
FIRE ARMS.—To Emanuel Beatson, of Birmingham, for an improvement to gun-locks. Dated March 23, 1814.

TO OUR READERS AND CORRESPONDENTS.

We shall be happy to give our best attention, and candid opinion of the merits of W. F's. plans, whenever convenient to him.

We will seek for the machines alluded to by "A. Planta," and, if we find, publish them.

R. I. and H. W. I. are unavoidably postponed.



GURNEY'S NEWLY PATENTED IMPROVEMENTS IN STEAM COACHES.

THE NEWLY-PATENTED IMPROVEMENTS IN STEAM COACHES,

By GOLDSWORTHY GURNEY, Esq., of Argyle Street.—*Enrolled April*, 1828.

THE wonderful changes that must result from the introduction of artificial power to propel carriages on the ordinary roads, having naturally excited an intense degree of interest in the public mind, we have been solicitous to preserve the lead we have hitherto taken, in affording the earliest and most accurate information, in every thing of importance relating to the subject. Had the many ingenious men, who are now actively engaged in the arduous attempt of constructing steam *coaches*, been contented with undertaking the formation of steam *waggons*, we feel perfectly assured, that the most complete success would, ere now, have crowned their labours. The construction of a slow-going vehicle, adapted to the conveyance of goods merely, appears to be of such easy attainment, and of such unquestionable utility and economy, that the patronage and support of the public would be immediately extended to it. Scarcely a day would pass without some improved modification being suggested, or some simplification of the machinery, that would tend to reduce the friction, increase the power, or accelerate the speed: so that by almost imperceptible steps, a rapidity of movement would be effected, and accommodations gradually introduced, for the conveyance of passengers. During this period of probation, the inventive talents of our cleverest mechanicians, would have been kept in full activity, and a spirit of enterprize excited among capitalists, that would most likely have insured, in a short period, the full maturity of an art which must yet be regarded as in its infancy. The child has unfortunately been made to attempt running, before it has been taught to walk.

We have been led into these observations, from inspecting the specification of a recent patent, taken out by Mr. Goldsworthy Gurney, "*for certain improvements in locomotive engines and the apparatus connected therewith.*"

In the Register of Arts, &c. vol. 1, new series, we described the first patent steam carriage of Mr. Gurney; since that period, experience has suggested the "improvements," which are the subject of his second patent, a particular description of which, we now proceed to lay before our readers.

The new carriage differs but little from the former one in its external appearance, by a reference to the description of which, as above mentioned, whilst perusing the subjoined account of the new arrangements, the reader will be able to form a correct idea of the whole. The principal novelties are the following:—

The coachman, or conductor, occupies the front seat over the fore boot of the carriage, the lower seat being removed. The four chimneys of the former carriage, are substituted for a single one of great width. The water tank, instead of being above the perch, and extending the whole length of the carriage, is now placed below

the perch, and lies between the fore and hind wheels. The propellers are removed entirely. A blowing machine is introduced, for maintaining a sharp draft in the furnace, which is worked by a separate cylinder from those employed in propelling the carriage. A mode of heating the water before it is admitted into the boiler, and an additional force-pump, unconnected with the engine, to be worked by hand, to throw in an increased supply of water into the boiler, whenever needed, are also adopted.

The coach, in its form and accommodations, bears a close resemblance to the stage coaches at present in use. It has a fore and hind boot, on which are seats for the passengers, and a box in front for the coachman, with room for a passenger beside him. The body of the carriage is supported upon three parallel perches, extending its whole length; the hinder part hangs upon springs, fixed upon the perches, immediately over the axes of the hind wheels, and the fore part is placed upon iron supports on the perches. The carriage runs upon six wheels, a small pair, called the pilot wheels, being placed in front, for guiding the vehicle; these are connected to the ordinary fore wheels of the carriage, by a small curved perch, which admits the axle of the former being placed oblique to the latter, by the turning of a lever, fitted on to the upper extremity of an upright spindle, which is attached to the axletree. The hinder extremity of this small perch is attached to an iron frame, supported upon springs, that are fixed on the axletree of the fore wheels; a little before the axletree, a strong pin passes through the small perch, and the centre main perch, which serves as a centre of motion to the small perch, so that the pilot wheels being placed obliquely, the perch turns upon the pin, and the fore wheels of the carriage with it. When not acted upon by the steering lever, the pilot wheels are maintained at right angles to the perch, by means of springs.

The blowing machine is placed, as before-mentioned, in the fore-boot; it consists of a fly of five vanes, that revolve on a vertical spindle, similar to a winnowing machine, but in a reversed position: this apparatus is worked by a small horizontal steam cylinder placed beneath, on the frame of the carriage. The piston rod of this cylinder is connected to a crank on the axis of a fly-wheel, revolving in a horizontal direction above; and to the same crank is attached, by an intermediate rod, the plunger of the force pump, which injects the water into the boiler. The steam engine thus drives the blowing machine, and the force pump, the fly-wheel serving to equalise the motions of both. The connection between the blowing machine and this steam cylinder is thus arranged; on the vertical axis of the fly-wheel are fixed small band wheels or pulleys of different diameters, and on the vertical spindle of the blowing machine are fixed other pulleys, which being connected to the former by an endless band, are driven round with them: the varied sizes of the pulleys enabling the engineer to force the air through the machine with any required rapidity. The air enters the blowing machine at the bottom of the circular box wherein the vanes revolve, and is

forced out at the side into a broad flat tube, called the "air-passage," which leads under the body of the coach into the ash-pit of the furnace.

Mr. Gurney's boiler we have already very fully described in our 26th No., new series, a reference to which, together with the annexed account of the improved modifications, will afford a correct notion of its present construction. This boiler, which is placed in the hind boot, consists of two or three series of pipes of an inch bore, bent into the form of a horse shoe, and supporting the fire grate at their upper and lower extremities, with two horizontal tubes of larger dimensions, into which the open ends of the before-mentioned smaller bent tubes enter and are fixed; and the two large horizontal tubes are connected by a series of ten open vertical pipes. The whole of the bent tubes, the lower straight horizontal tube, and the half of the upper one, (which may be termed a steam reservoir) are kept filled with water. From the top of the steam chamber proceed two curved pipes, which enter two large vertical tubes of strong plate iron, strengthened by hoops externally; these last are called *separators;* they communicate at their lower ends with the boiler, and at their upper ends by a connecting tube, from which a branch enters the chimney, and passing over the top and down the back of the furnace, is carried through the air passage, along through the fore boot, and back again as far as the centre of the carriage, where it is connected with two horizontal cylinders, firmly secured between the main perches, and serving to give motion to two cranks on the axis of the hind wheels, by which means the carriage is impelled.

The steam is worked expansively, being shut off at half the stroke by means of a slide valve, the rod of which is worked by a cam on the axis of the hind wheels. The slide valves by which the steam is admitted to the cylinders, are worked by a lever on the axis of which is fixed an elliptical ring having a notch at top and bottom. A rod attached to an eccentric on the hind axle, has a pin falling into the lower notch in the elliptical ring; and to reverse the motion a line is attached to the rod and placed within reach of the coachman; by pulling this line, the pin is brought into the upper notch, and the motion of the carriage thereby reversed.

Beneath the main perches is placed the tank for the supply of the boiler, it communicates (by pipes from its lower part) with the force pump beneath the fore boot, and also with a small forcer placed within reach of the fire man, who sits behind the boilers. Immediately above the tank is a flat vessel through which the steam passes from the eduction pipe, and thence by another pipe into the chimney.

The pipe from the force pump passes through the air chamber and forming a coil above the horse-shoe tubes, delivers the water into the upper part of the steam chamber. The supply from the pump may be diminished by partially opening a small cock which allows a portion of the water to return to the tank.

Any part of the preceding account that may appear abstruse to the reader, will be rendered perfectly clear by an inspection of the accompanying engraved vertical section of the machine, together with a reference to the following explanatory letters.

a a a, a series of small tubes in two or more ranges, forming the boiler; the interior range serving to support the fuel; these tubes are connected with *b b*, two larger tubes, the upper one forming a steam chamber: *c*, one of a range of tubes connecting *b b* together; *d*, one of the two separators, connected with *b b* by two curved pipes: *e e e*, steam pipe proceeding from the upper part of the separator, and passing down through the chimney and beneath the body of the carriage into the fore boot, whence it descends to *f*, the cylinders which propel the carriage, by means of cranks, *g*, on the axis of the hind wheels; *h*, an eccentric which works the slide valve, *i*, by a lever turning on its centre, and to the extremities of which lever an elliptical ring *k* is attached; *l l*, a line fastened at one end to the eccentric rod, and at the other end, to a short lever in the fore boot, which may be elevated by means of the lever *m*; this raising the eccentric rod, causes the pin in its extremity, to act upon the upper side of *k*, and thus *reverses* the motion of the carriage; *n*, lever for regulating the throttle valve *o*; *p*, eduction pipe, opening into a flat chamber *q*, in which the steam expands, and thence passes through the waste pipe *r r*, into the chimney *s s*; *t*, tank for water; *u*, force pump supplied by the suction pipe *v*, and forcing the water through the pipe *x x x*, (which forms a coil above the boilers), into the tubular boilers *a a a*; *y*, a stop cock by which the supply from the force pump to the boilers is regulated, any requisite portion being allowed to return into the tank; *z*, seat for the fireman; 1, a blowing machine or frame driven by bands from the axis of the fly wheel 2, which is worked by a small engine 3, (serving also to work the force pump *u*; 4 4 4, steam pipe supplying the engine 3; 5 5, air channel, leading from the blower to the furnace; 6, guide wheels which may be placed obliquely to the perch 8, by the lever 7; 9, centre of motion on which the perch 8 turns, thus turning the fore wheels, on the axis of which are springs that support the fore part of the coach; 11, force pump to supply the boilers in case the water is too low to be worked by the fireman.

HEAT.

The annexed accounts of experiments on heat, convey some useful information on the subject.

Comparative Conducting Power for Heat of various Substances.—From a series of experiments very carefully conducted, M. Despretz has obtained the following results.

Gold	1000·0	Tin	303·9
Silver	973·0	Lead........	179 6
Platina	981·0	Marble	23·6
Copper	898·2	Porcelain	12·2
Iron	374·3	Fire Bricks ..	11·4
Zinc	363·0		

All the bars used were square prisms. Cavities were made in them at equal distances of 10 centimetres, to receive the bulbs of small thermometers. The side of the section, except for the two last bodies in the list, was equal to 21 millimetres. The bars were

covered with the same varnish, to give them an equal radiating power. The bar experimented with was heated at one extremity by a small stove, which has the advantage of being governed readily, and of causing but little heat in the place. The temperature of the air was ascertained by a sensible thermometer, and it was found easy to make it nearly uniform for the whole of an experiment. Each experiment continued six hours, and it was only after two or three hours that all the thermometers became stationary. The thermometer nearest to the source of heat acquires the temperature at which it is to be retained stationary, and then the heat is managed so that it shall not rise or fall by that instrument until the experiment is finished.

Wood conducts so feebly, that a bar of 21 millimetres does not become sensibly heated a few centimetres from one of its extremities so far raised in temperature as to carbonise the substance.—*Annales de Chimie.—Quarterly Journal, N.S. No.* 5.

HEAT IN FLUES.—Numerous experiments have lately been made in France, for ascertaining the laws, regulating the rapidity with which hot air passes through flues, &c. The results appear to be, —first, that flues oppose to the passage of hot air, a resistance proportioned to the length of the pipe, the square of the rapidity, and in an inverse ratio to the diameter:—secondly, that the co-efficient of friction, is not the same with reference to different substances:—thirdly, that by narrowing the superior orifice of a flue, the rapidity of the passage of the air through that orifice, goes on increasing to a certain limit, which is the rapidity resulting from the pressure that takes place at the inferior end of the pipe:—fourthly, that by narrowing the inferior orifice of a flue, the body of air passing through, diminishes solely in proportion to the diameter of the orifice, and consequently, that the rapidity in the orifice itself, increases in an inverse ratio to its diameter. The two last results are capable of numerous applications to the useful arts.

It now appears, that the diameter of the chimney is also a powerful element in draught; limited, when the superior orifice is fixed; indefinite, when it is not so: and this element costs very little expence.—*New Monthly Mag.*

THERMOMETER OF CONTACT,

By M. FOURRIER.

THIS instrument ascertains with accuracy, the greater or less facility with which heat passes through sheets, or thin plates of different bodies. Every body knows, that on touching different substances maintained at the same temperature, the same calorific impression is not received, in consequence of the different conductibility of those bodies. It is even sufficient to cover those bodies with a thin sheet of paper, sensibly to change the effect of the contact. If then, on a support kept at a constant temperature, for example, at that of melting ice, thin sheets of different substances are successively applied, the simple contact of the naked hand will suffice to class a great number of them according to their order of conductibility. But this

method is by no means accurate, and is liable to other inconveniences. M. Fourrier's instrument may be considered as an improved hand, and minutely establishes the facts to which the application of the hand only makes an approximation. It is extremely simple; it consists of a cone of very thin iron, filled with mercury, and terminated at its circular base by a skin of moderate thickness. A thermometer is placed in the mercury; it is this skin which is put on the thin sheet applied to the support. The contact is very intimate in consequence of its flexibility; and the thermometer indicates the variations of temperature. By this instrument, many curious facts have already been ascertained. For instance, it has been shewn, that the order in which thin sheets of different substances are placed one upon another, influences the quantity of heat which passes through them under the same external circumstances. Thus, the interposition of a sheet of leather facilitates the transmission of heat from skin to cloth, it does not change it from cloth to cloth, and it obstructs it from cloth to marble.

IMPROVED DRAINING SYPHON,

By Robert Cowen, Esq. of Carlisle.

Theoretically speaking, water will rise in the short leg of a syphon to a height equal to the atmospheric pressure, or about 32 feet; and therefore pits and quarries, so situated as to have a sufficient out-fall might, it would seem, be drained by means of a syphon, so far that the water shall not rise higher in them than within 32 feet of the surface. But when this plan is attempted to be put to practice, it will be found, that a syphon will not long continue to act if it has to raise water more than 12 or 14 feet. The reason of this is, that the air which all common water contains, begins to separate from that fluid as it rises under diminished pressure, through the short leg of the syphon, till at length the angle of the syphon is filled with air, and the current of water is interrupted.

Water, Mr. Cowen observes, has an affinity for air and some of the gases, and when exposed to them under the pressure of the atmosphere, absorbs a portion of each. This affinity may be considered as a given force; it is destroyed by boiling and the air is expelled; it is also diminished as the atmospheric pressure is removed, and a portion of air is set free at something less than half the weight of the atmospheric column. The weight of the opposing columns of water suspended in the two legs of the syphon, it is evident, must diminish the atmospheric pressure, at the highest bend, in an inverse ratio to the height of the short leg or column; when this exceeds 12 or 14 feet, air is set free, displacing the water at the highest bend of the syphon; thus dividing the two columns, and entirely preventing that continuous flow which would otherwise take place were water to contain no gas or air. To remove this defect, Mr. Cowen places a box at the upper angle of the syphon, into which all the air separated from the water rises, and the application of a forcing pump for a few minutes once or twice a day drives the air out of the box into the atmosphere.

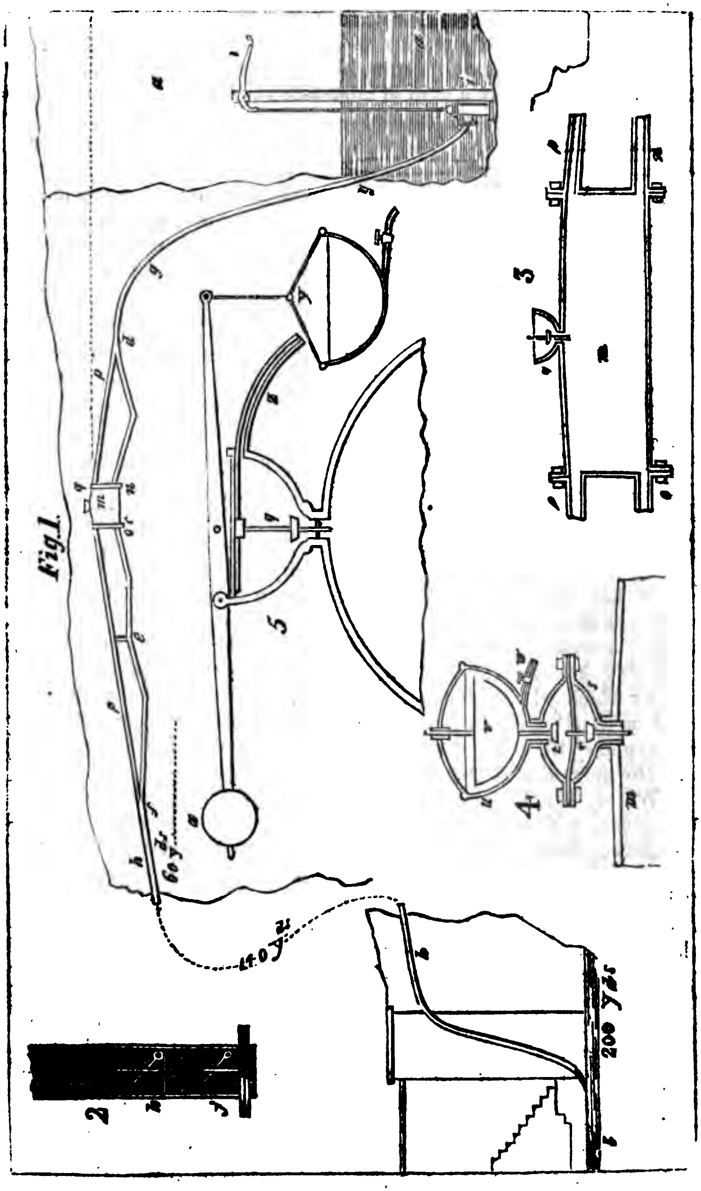


Fig. 1.
60 yds
140 yds
200 yds
2
3
4
5

Fig. 1, *a a* represent part of the quarry to be drained; *b*, a level lower than the bottom of the quarry, which in this case is 200 yards off, where the water is to be discharged; *c*, the highest ground, over which the water is to be conducted; *d e* and *f*, three distinct rises, over which the pipes pass, (they are further apart than here shewn;) *g g*, *h h*, the lead pipe composing the two legs of the syphon; *i* a common forcing pump fixed below the surface of the water, having a hinge valve at *j*, fig. 2, and an open working box, with a similar valve *k*. These valves are opened by the force of the water flowing through the pump in its passage to the syphon; *l*, the working handle of the pump; *m* is a close iron receiver, shewn larger in fig. 3, having inserted at the end *n*, the ascending leg of the syphon *g*, and at the other end *o*, the descending leg *h*; at the upper side of both ends are inserted two small air pipes *p p*, joining with the syphon pipe at the highest bends, as shewn at *d e* and *f*, with a regular slope into the interior to allow the air to ascend into it; *q* is a small valve fixed at the highest point of the receiver, to allow the whole of the air to escape through the valve when the water is forced up by the pump; for this purpose, the pump *i*, and pipe *g*, must be capable of supplying water quicker than the pipe *h* will carry it off.

Directions to be observed in laying the syphon to suit different situations.—First, in laying the pipes of the syphon, it is necessary to give them a regular slope to admit the air to pass forwards into the receiver, or to the highest bends, which must have either an air-receiver to each bend, or a pipe inserted to convey the air into a general receiver.

Second, when sufficient descent from both sides of the air-receiver can be obtained, no air pipes will be required.

Third, in situations where it may be necessary to carry the pipes over more than one elevation, and the second exceeds the height of the first, a separate receiver will be required for each elevation. On this construction, viz., with more than one receiver, it is necessary to adopt the following expedient for closing the valves in succession as the air is expelled from each receiver.

Fig 4, *r* is the lower valve in the receiver *s*, which is opened by the force produced by pumping, and the air escapes; *t* is an inverted valve, with a float *v* fixed upon the valve spindle, in the centre of the cup *u*. While air only is expelled, the inverted valve will remain open; but when the water is forced out and fills the cup, the float will rise, and close the valve at the same time; thus, the water being stopped from flowing out, will be forced forward to any number of receivers in succession; *w* is a very small outlet pipe inserted into the bottom of the cup *u*, through which the water escapes slowly; as the cup is emptied, the float is lowered, and the inverted valve again opened, a position necessary to allow the air to escape at the next pumping.

Another method for closing the valve, is represented at fig. 5; *q*, is a valve placed in a cup, as shewn in fig. 1; on the

cup is mounted a lever with a counterweight *x* at the end, and a small pendant receiver *y* at the other end; *z* is a conducting tube inserted into the edge of this cup, to convey the overflowing water into the receiver, which as it fills, loads the valve, and prevents the escape of the water, and thus forces it forward as before described, to any number of receivers.

As it may be expected that the first receiver will collect the greatest portion, or nearly the whole of the air, the others following in succession may be proportionally smaller.

In making the joints of the lead pipes, Mr. Cowen used tinned copper hoops, and made the joints square, or jump joints, and soldered them over in the common manner. The joints of the air-receiver were made with iron cement, with a portion of red lead in powder added, and mixed up with oil in place of water, as in the usual way, and caulked into the joint in the same manner as common cement.

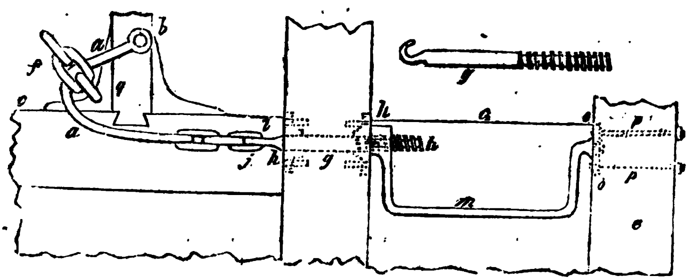
The preceding account of this valuable improvement in the art of draining by means of the syphon, is an abbreviation of the original description of it by Mr. Cowen, in the last published volume of the Transactions of the Society of Arts, for the communication of which, the Society has awarded to him its Gold Vulcan Medal. In a second communication, Mr. Cowen gave some interesting details of his experiments, which our readers may find in the 45th volume of the Transactions of the Society, p. 117.

STOPPER FOR A CHAIN CABLE,

By Lieutenant J. B. Kooystra, R. N. of Queen St. Golden Square.

The box containing the chain cable is placed on the lower deck of a ship of war, and the chain passes through a stopper, formed of an iron hook or clip, secured to one of the beams that support the main deck, by means of a bolt that passes through an eye in one end of the stopper. The stopper is thus placed in a horizontal position, and is capable of moving on its bolt, so as either to pinch the cable or let it run freely. The stopper is closed or opened, by means of a tackle which is fixed on an eye bolt in the lower deck, and requires eight men to manage it. The oblique strain which the tackle exerts on the stopper, is very disadvantageous, both to the stopper and to the tackle; this latter indeed, often gives way, that an additional one is always in readiness, in case of accident. Mr. Kooystra omits the tackle, and supplies its place, by attaching to the loose end of the stopper a few links of chain, terminating in a screw bolt, which passes horizontally through the nearest cross beam, and is received at the other side into the hollow screw of a crank or winch, which, when turned by two men in one direction, or the contrary, causes the stopper to clasp or to release the chain cable. The advantages contemplated by the inventor are two; namely, to substitute the labour of two men for that of eight, and to secure the stopper more effectually, and with less risk of accident.

Fig. 1 is an under view of the part of the deck where the stopper



a a is fixed; *b*, the bolt or centre on which it turns; *c c*, the side of the hatchway; *d* and *e*, are portions of two beams; *f*, part of the chain cable held fast by the stopper; *g*, a square bar sliding through the beam *d*, and through the square holes of the metal facing plates *h h*; *i*, the hook in the end of the bar *g*, which takes the link *j* of the stopper; *k*, a double-threaded screw on the other end of the bar *g*; *l*, the screwed end of a crank handle *m*, fitted on the screw *k*; the other end *n* is well secured, yet so as to turn freely in the plate *o o*; *p p*, the bolts which secure this plate to the beam *e*.

Fig. 2, shews the sliding bar *g* separate. It is evident, that in turning the crank *m* one way, it unscrews from the bar *g*, and as it cannot retreat, (being stopped by the beam *e*,) the bar is therefore slid through the beam *d*, and loosens the stopper, so that the links *j* may be lifted off the hook *i*, and on turning it the other way, it draws the bar *g* back, which pulls the stopper *a* after it, and presses the chain cable *f* quite tight against the iron elbow *q*.

The Silver Vulcan Medal of the Society of Arts was presented to Lieutenant Kooystra, for this invention, and a model of it placed in the Society's Repository.—*Trans. Society of Arts*, Vol. xlv.

ESSAYS ON LITHOGRAPHY. NO. III.

(Continued from p. 60, Vol. II. N.S.)

Lithographic Crayons for Drawing on Stone.

It is impossible to obtain beautiful lithographic impressions, if the crayons used by the artist have not the requisite qualities. The ingredients of which they are composed, ought to be of such a nature as to adhere firmly to the stone, after the design has undergone the preparation by the acid, as well as during the process of drawing it. They ought to be sufficiently hard to admit of being brought to a very fine point, and to allow the artist to make clear and well-defined lines, without the danger of breaking it off. If they are made too dry or porous, they are subject to break very frequently; if too soft, they crumble, and will only form coarse and confused lines, making it impossible to produce a drawing possessing character and neatness. It would be rendering a great service to

lithography, to discover the means of forming crayons as hard as those made of black lead, so as to be able to trace on stone, lines as fine and clear, as those made with these pencils. It is in fact an improvement, which the art yet requires. The following composition, however, is, in the present state of lithography, found to answer the purpose.

Soap, from suet, or tallow,—dry	-	150 parts.
White wax, free from tallow	- -	150
Lamp black	- - - - - -	25

The soap and the wax are to be put into a covered skillet, on a brisk fire; and when the whole is perfectly melted, the lamp black is thrown in, a little at a time, taking care to stir the mixture continually. The common lamp black of commerce may answer, without its being necessary to calcine it; but when, as is sometimes the case, it contains particles of sand or earth, it must be rejected; it ought also to be extremely fine. The whole should be allowed to boil for a few moments, in order that the mixture may be complete, the composition is then poured into a mould of wood, or of brass, which is made to open and shut at pleasure, and in which twenty-five or thirty crayons may be formed at once. It is necessary to rub the mould with oil, to prevent the material sticking to it. After having filled it, it is opened, and the crayons removed; it is then closed again, and fresh matter poured in, which must be kept very hot. A flat plate of metal is sometimes used instead of a mould: it must be made warm, to prevent the composition cooling too rapidly, and be surrounded by four ledges of wood, in order that the melted mass may not run over the edges; a quantity is then to be poured in, sufficient to make the crayons of a convenient thickness. The pieces of wood are immediately removed, and the material is cut with a knife, into such strips, as to form crayons of the desired size. It is necessary to be very quick in this operation, that the paste may not have time to cool, for in this case it would break under the knife. The crayons thus cut, will separate readily from the plate, if care have been taken to rub it with oil. The formation of air-bubbles is prevented, by allowing the boiling to cease for a moment before pouring out the matter, or by pressing it with a stone, or some other body, that has been made warm.

Lithographers submit the materials which they employ in the composition of their crayons, and even their ink, to the action of burning; but this method is, nevertheless, a very bad one, as in the combustion a part of them is entirely destroyed, and it is besides impossible always to obtain with certainty, crayons of the same quality. Some persons pretend that it is necessary to use different kinds of crayons, during the progress of the drawings; but if the artist have a really good crayon, he will find it answer equally well for every part of his work: or the utmost that can be required, is a trifling difference in the degree of hardness given to them, which difference may be effected, by increasing or diminishing the quantity of wax in the compound, or by adding to it a little mastic. Another

composition has been recommended for crayons, called *re-touch crayons*, and which are used for repairing those parts of a drawing, which are accidentally detached from the stone, during the operation of drawing; but a crayon which is suitable for forming the design in the first instance, will serve equally well for these re-touches.

(To be continued.)

SCIENTIFIC INSTITUTIONS.

Royal Institution.—The annual general Meeting of the Members of this Institution was held on Thursday, the 1st of May, to elect Officers for the year ensuing, and receive the managers' Report on the state of the Institution.

The Duke of Somerset was elected *President;* Sir S. B. Morgan, Bart. *Treasurer;* E. R. Daniell, Esq. *Secretary;* and C. Barclay, Esq. M P.; B. B. Cabbell, Esq.; H. T. Colebrooke, Esq.; Sir G. Duckett, Bart.; I. L. Goldsmid, Esq.; Joseph Jekyll, Esq.; G. Moore, Esq.; R. I. Murchison, Esq.; W. Nicholl, M. D.; W. H. Pepys, Esq.; C. Pilgram, jun. Esq.; Captain E. Sabine; Sir C. Scott, Bart.; W. Somerville, M. D.; and E. Sterling, Esq. *Managers.*

The Report represented the affairs of the Institution in a very favourable point of view; nearly 100 new members had been elected during the year;—and John Fuller, Esq. has given a *Gold Medal,* to be awarded by the Managers once in two years, for *Discoveries in Chemistry.*

London Mechanics' Institution.—

MR. HEMMING'S SIXTH LECTURE ON CHEMISTRY. HYDROGEN.

Mr. Hemming stated that shortly after the discovery of hydrogen gas, it was observed that water was formed during its combustion. Mr. Macquer discovered this extraordinary fact by holding a clean white saucer over an ignited jet of hydrogen, for the purpose of collecting any carbonaceous matter that might be evolved. The saucer was speedily covered with minute globules of water in the form of dew. Priestly and Cavendish, by burning or exploding hydrogen with atmospheric air, or oxygen gas, collected, at different times, considerable quantities of water. The general opinion was, that during the combustion of hydrogen, the vapour it contained was precipitated, and thus the production of water was accounted for. Mr. Watt has the honour of first conjecturing that hydrogen was a component of water, and that it united with its other constituent by combustion to form the liquid. The truth of this conjecture was very satisfactorily demonstrated by Lavoisier, who passed the vapour of boiling water through a tube containing ignited iron, and found that it was decomposed into oxygen and hydrogen. The latter element escaping in the gaseous form, while the oxygen combined with the iron. The composition of water is proved analytically and synthetically by electric agency. By the voltaic battery it is decomposed—the hydrogen is evolved at the negative pole, and the oxygen at the positive; the volume of the former being double that of the latter. If these gases are transferred into an exhausted vessel, and fired by an electric spark, water is again formed. Mr. Hemming exhausted a thick glass vessel of its air, and filled it with the gases properly mixed; an electric spark was then passed through them, and the vessel, which was before perfectly bright and clean, was instantly covered with dew.

Hydrogen gas, although so eminent a combustible, is not capable of combustion unless in presence of a supporter. To prove this, a tall narrow glass was filled with hydrogen, which was ignited: the flame only appeared at the surface, where it was in contact with the atmosphere, and descended gradually to the bottom of the glass. The electric pistol was then filled with hydrogen, and Mr. Hemming passed the charge of a Leyden jar through it without exploding it; but when a portion of atmospheric air was mingled with it, a small spark from the electric machine occasioned its explosion with a loud report. Mr. Hemming explained the cause of the report, and stated, that when the gases, oxygen and hydrogen, were mixed in the proportion necessary to form water, a still louder report was produced. To illustrate this, the lecturer suspended a bladder full of mixed gases from the diagram board, and passed an electric spark through it by means of chains; it exploded with a tremendous report, and the bladder was shattered to atoms. Mr. Hemming said that sometimes more agreeable sounds were produced by hydrogen gas. If a jet of it is burned in a bottle or flask with a narrow neck, or in a long tube of small diameter, a loud shrill sound is emitted. Carbonic oxide will produce the same effect; it is supposed to be produced by the series of slight detonations which occur in combustion communicating vibration to the tube, which causes undulation in the air. Some glass tubes were held over an ignited jet of hydrogen, and a moaning tone was produced, which excited much laughter. This gas also occasions, when breathed, a singular alteration of voice, by construction of the vessels of the thorax. The lecturer inhaled a portion of it, and his voice was remarkably changed, the tones were shrill and indistinct, and utterly unlike those of the human voice. The effect did not continue many seconds.

The ingenious adaption of hydrogen to the construction of instantaneous light machines, was explained and illustrated by the exhibition of a Volta lamp, in which a jet of the gas is fired by a spark from an electrophorus. The hydrogen is emitted and the electrophorus discharged at the same instant by turning a handle. The hydro-pneumatic lamp was also shewn, in which a stream of the gas issues by turning a cock on to some spongy platinum, which it instantly ignites, and the ignited platinum then inflames the gas. Mr. Hemming then explained the manner of forming artificial or philosophical fire-works. This is done by attaching revolving jets to the stop cock of a bladder containing hydrogen. When the bladder is pressed, the hydrogen issues from the apertures of the jet, and is ignited; the revolution of the instrument produces continuous circles of fire. This effect was shewn in a pleasing manner.

The lecturer proceeded to describe the intense heat of oxygen and hydrogen gases during combustion, when mixed in the proportions necessary to form water. By employing a blow-pipe filled with these, sufficient heat is generated to dissipate the most refractory substances. Various blow-pipes for this purpose were described, and their danger pointed out. Mr. Gurney's safety oxy-hydrogen blow pipe was then introduced, and its effects shewn by the instant combustion of a watch spring, which was dissipated in vivid scintillations, and by the combustion of a piece of lime, which emitted a light almost too intense for the eye to endure.

Mr. Hemming stated that with this lecture he terminated the first part of his course; in a few weeks he should resume the consideration of the chemical gases.

Geological Society.—The anniversary of this Society was held on the 15th February, when the Officers and Council for the present year were elected. After which an able and eloquent address was delivered by the president, Dr. Fitton.

On the 7th March a paper was read—"*On the geological relations and internal structure of the Magnesian Lime Stone, and the lower portions of new Red Sand Stone series, in their range through Nottinghamshire, Derbyshire, Yorkshire, and Durham,*" by Professor Sedgewick.

ROYAL SOCIETY OF LITERATURE.—At a late meeting of the council two Royal Gold Medals, given annually to individuals distinguished by the production of works eminent in *Literature*, were adjudged to CRABBE, *the poet*, and to ARCHDEACON COXE.

NATIONAL REPOSITORY.—Preparations are in progress for forming an Exhibition of Specimens of new and improved Productions of the artisans and manufacturers of the United Kingdom, in large apartments at the Royal Mews, Charing Cross, the particulars of which we will lay before our readers when the plans are more matured.

MISCELLANEOUS INTELLIGENCE.

A NEW STEELYARD—has been invented in France, which is said to posess greater accuracy than the description of that machine, hitherto in use. One of the improvements in the new invention, is the ease with which it may be verified. The divisions, which are marked on the long arm of the beam, begin from a zero point; that is, from a point at which the travelling weight places the machine in exact equilibrium, when no weight is attached to the short arm of of the beam. This enables the most ignorant person to judge at once of the correctness of its construction.

ZINC ROOFS.—Roofs covered with zinc plates, are very common in the Low Countries; owing to the great combustibility of the metal in cases of fire, inflamed portions of it are dispersed in all directions which occasions great danger to persons approaching the building.

VITRIFIED SAND TUBES.—It is well known that, in the highest mountains, tubes of vitrified matter have been found, the exact mode of the production of which has hitherto been undiscovered; but which natural philosophers have in general ascribed to the effects of lightning falling on a sandy soil, and melting and vitrifying the sand to a greater or less depth. All doubt on the subject is now removed, by similar tubes having been seen instantly formed in places where lightning has fallen. M. Fiedler, a young German philosopher, has collected several in Germany, which he has presented, through M. Arago, to the French Academy: they are remarkably large; one is above 19 feet long.

LOGARITHMIC CARDS.—A foreign mathematician, of the name of Wronski, has arranged the logarithmic canon on a single card, about the size of an octavo page; with this the logarithm to seven places of decimals may be obtained for any number; while from cards of much smaller dimensions, the logarithms to four or to six places of figures (enough for common purposes) may be found.

SCULPTURE.—A magnificent bust of Agamemnon has recently been brought to this country, and placed in the entrance hall of Earl Bathurst's seat at Cirencester. We understand that it was executed by a young artist, and was brought from Italy by Lord Apsley. It is of gigantic dimensions, and sculptured from a solid block of beautiful white marble. The workmanship is of so ex-

quisite a character, that hardly a lineament of the warrior's countenance appears to have been neglected; but every expression of mind described by Homer, as the attributes of the Grecian leader, has been delineated.

THE HIPPOPOTAMUS.—The head of an hippopotamus, with all the flesh about it, in a high state of preservation, has recently been brought to England, as a present to the King. This amphibious monster was harpooned while in combat with a crocodile, in a lake in the interior of Africa. The head measures four feet in length, and eight feet in circumference. At one time it was not uncommon in the Nile, but now it is nowhere to be found in that river, except above the cataracts.

HERCULANEUM.—The excavations of this ancient city have recommenced, and it is expected that the architect entrusted with the direction of the labours will be able to clear away entirely the rubbish, both from the exterior and interior of one of the theatres. Thus, a complete specimen of the ancient theatre will be exhibited to the world.

GEOGRAPHICAL DISCOVERIES.—The Geographical Society of Paris offer a gold medal, value 1000 francs, to the traveller who shall make the most important discovery in 1828. In addition to this, he will, if a foreigner, be received as a correspondent of the Society, and if a Frenchman, as a member.

LIST OF NEW PATENTS.

HATS AND BONNETS.—To Jane B. Lowrey, of Exeter, for certain improvements in hats and bonnets. Sealed March 25. Six months for enrolment.

CUTTING PAPER.—To Edward Cowper, of Clapham Road Place, Lambeth, for certain improvements in cutting paper. March 26. Six months.

FILTERING APPARATUS.—To F. de Fourville, of Piccadilly, for certain improvements in filtering apparatus. March 26. Six months.

THREAD.—To Thomas Lawes, of the Strand, for improved thread, to be used in the manufacture of bobbin net lace. March 29. Six months.

HYDRAULIC MACHINES.—To Henry Marriott, of Fleet Street, and Augustus Siebe, of Princes Street, Leicester Square, for improvements in hydraulic machines. March 29. Six months.

FLAX DRESSING.—To Peter Taylor, of Hollingwood, Lancashire, for improved machinery for dressing flax, &c. March 29. Six months.

SUGAR REFINING.—To John Davis, of Leman Street, Goodman's Fields, London, for improvements in evaporating solutions of sugar, and other liquids. March 29. Six months.

NAVIGATION.—To Charles Harsleben, of New Ormond Street, for improvements in machinery, applicable to the propelling of ships, &c. April 3. Six months.

PROPELLING.—To Samuel Wellman Wright, of Mansfield Street, Borough Road, Surry, for improvements in wheel carriages, and the machinery for propelling them. April 15. Six months.

CHRONOMETERS.—To John Gottlieb Ulrich, of Cornhill, for improvements in chronometers. April 19. Six months.

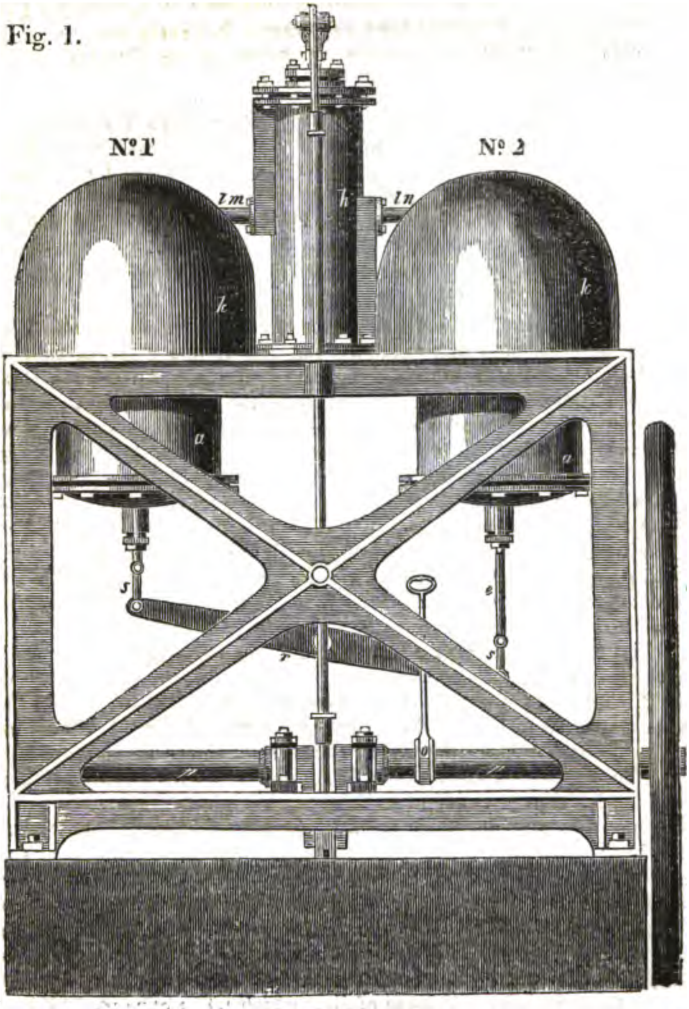
TO OUR READERS AND CORRESPONDENTS.

"Sad Dog" has a proper feeling towards his brethren, in proposing them to be employed, "out of harm's way," in the ensuing dog days, in pumping water out of the Tunnel: but as his communication is too technological for us, we would recommend him to send it to Mr. Gill, who has recently proposed the employment of ass power, in his Repository; as if he had ever employed any other.

Mr. Green's Underdraining Plough is intended for early insertion.

Mr. Clymer's Pump is engraved, but we want a section, or plan of the valves, to make it comprehensible.

Fig. 1.



PATENT AIR ENGINE,

By Messrs. Parkinson and Crosley.*—*Enrolled April*, 1828.

We have the pleasure to lay before our readers another, and we believe more successful attempt, to render available to useful purposes, the elastic force of air, in the construction of a new motive engine, than any previous arrangement for the same purpose. We

* Mr. William Parkinson, of Barton-upon-Humber, and Mr. Samuel Crosley, of the City Road.

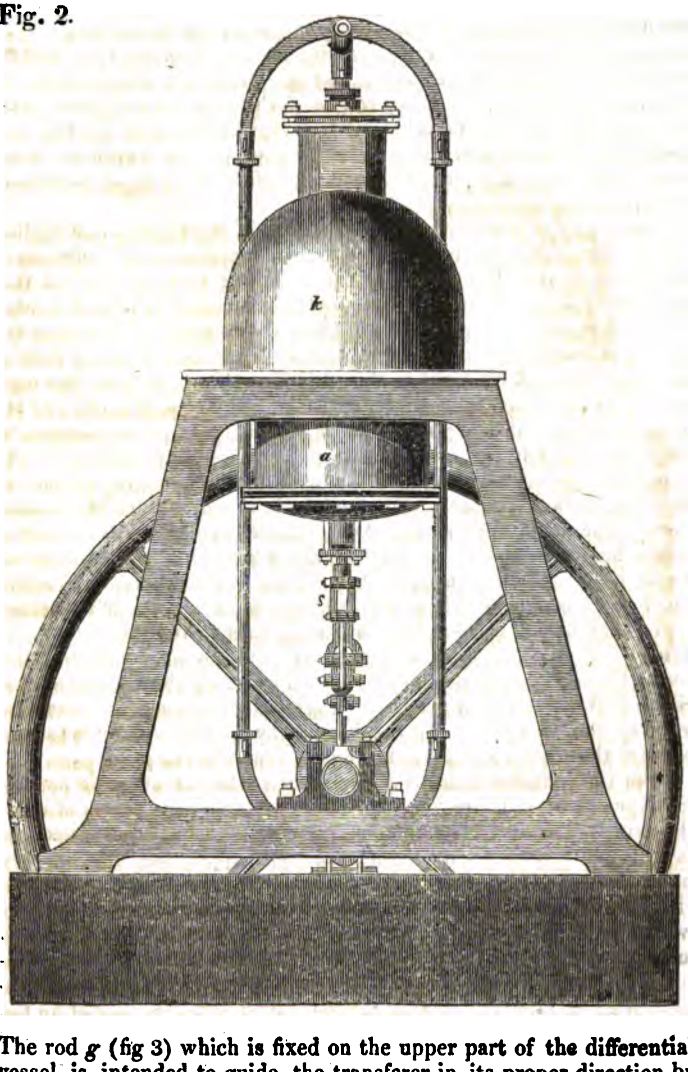
have seen two models of these air engines at work, in which two distinct modifications of the patent apparatus are introduced. The operations of heating and cooling the air are performed so rapidly by them, as to cause 150 strokes of the piston in a single engine to be made per minute. The patentees not having yet completed their experiments on the large scale, we shall at present confine our attention to the specification of their patent, just enrolled; from which we make the following extracts, divested of legal tautology, and therefore somewhat abridged.

The power of this engine is derived from the heating and cooling of air, in an air-tight vessel, which the patentees term a *differential vessel;* a portion of this vessel being exposed to heat, and another to cold, externally. Inside the differential vessel is placed another of a similar figure, called a *transferer;* this being moved from the hot to the cold parts of the differential vessel, and from the cold to the hot, alternately, transfers the air, and subjects it to the variations of temperature, as it passes along the internal surface of the differential vessel; and thus, by the expansion and contraction of the air, produces force for giving motion to machinery. The patentees do not claim to be the discoverers of obtaining power, by the alternate contraction and expansion of the air, by the process of heating and cooling, but in the peculiarity of their method of effecting it. One of the most approved forms for this purpose we shall now proceed to describe, with reference to the accompanying drawings; figures 1 and 2 of which, are upon a scale of two-thirds of an inch to the foot, and fig. 3, of one inch to the foot.

Fig. 1 shows a front elevation of so much of an engine as is necessary to explain the invention; fig. 2 is an end elevation, and fig. 3 is a section of a differential vessel and its transferer, exhibiting also, a mode of heating and cooling the differential vessel. The same letters in each figure, where they occur, refer to the same parts.

The differential vessel, *a a,* is of the form of a hollow cylinder closed with convex ends, of such a length as to preserve an essential difference in the temperature between one end and the other, and nearly one half of it being subject to a hot, and nearly the other half to a cold medium. The vessel has a stuffing box at the end *f,* and at the other end is an opening or pipe *l m,* or *l n,* for the purpose of forming a communication with the working cylinder and piston. The transferer *b b* is in this instance made a hollow vessel, air tight, and so much shorter *as to leave a sufficient space in the differential* vessel for containing a volume of air, which when expanded by heat and passing through the pipe *l m* or *l n,* will also fill the working cylinder, and force the piston from one end of it to the other; the transferer is also made, only so much less in diameter as to admit of its being moved freely from one end of the differential vessel to the other. To one end of the transferer is fixed a rod *e* passing through a stuffing box *f,* for the purpose of moving it from one end of the differential vessel to the other, thereby causing the air to pass in a thin stratum against its hot and cold parts, alternately, thus producing the force or power to be employed against the working piston.

Fig. 2.



The rod *g* (fig 3) which is fixed on the upper part of the differential vessel is intended to guide the transferer in its proper direction by means of a tube which is inserted in the upper end of the transferer for that purpose, the lower end of which is made air tight.

A differential vessel constructed on this plan may be applied to the purpose of working a single engine, acting only on one side of the working piston after the manner of the well known steam engines, called single or atmospheric steam engines, but in most cases the patentees prefer the use of two of their differential vessels

as pointed out in the drawings fig. 1 and 2, directing the power alternately on each side of the working piston, after the manner of double steam engines. Motion is given to the transferer by means of the eccentric *o*, in the shaft *p*, being connected with the beam *r*, which beam is connected to the rods *e* of the transferers by the links *s s*. The working cylinder *n*, with its piston, side rods, cranks, shaft, and fly-wheel and eccentric motion, are the same as those commonly used in steam engines, and therefore require no particular description.

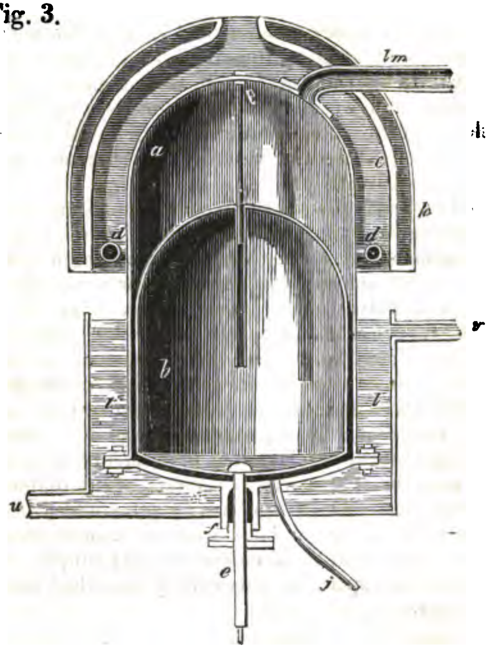
The pipe *l m* communicates the differential vessel, No. 1, with the top of the cylinder, and the pipe *l n*, communicates the differential vessel, No. 2, with the bottom of the cylinder; the operation of the engine will be as follows. Supposing the eccentric disconnected from the beam *r*, and the upper parts of the differential vessels heated, and their lower parts cold, and the transferers of the two differential vessels placed by hand in the situations shewn in the drawing, and the volume of air occupying the hot part of the differential vessel, No. 2, and being increased in elasticity in proportion to its temperature, whilst the volume of air in the differential vessel, No. 1, is occupying the coldest part, the working piston will be forced upwards, by a power corresponding with the difference of elastic force of the air in the two differential vessels, and when the working piston has been forced to the top, the situation of the transferers should be reversed by hand, so that the air in the differential vessel, No. 1, will occupy the hot part, and communicate its force to the upper side of the working piston, and thereby produce a returning stroke, and the eccentric being then by hand re-connected with the beams the alternate expansion and contraction of the air in the two differential vessels will keep the engine in motion; and thus by working the transferers in the same way as the valves in steam engines the engine may be either put in motion or stopped.

For the purpose of heating the vessels, the patentees prefer the employment of inflammable gas, as it may be easily procured in all the principal towns in the kingdom; and as by using compressed gas in portable vessels, will be rendered more applicable to locomotive purposes. As the street mains during the day time, although charged, are generally charged at so light a pressure, that the supply would be inadaquate, the machine (commonly called a gas meter,) may be employed as a rotary pump for obtaining a supply, by connecting with its axis a train of wheel work, with a spring or weight to be wound up after the manner of clocks or time pieces, giving to the meter a rotary motion. The mechanism of clocks being so generally understood, it is unnecessary to describe it here; it should, however, be observed, as the axis of the meter is below the surface of the water in the meter, one end of it should always project through a stuffing box, in order to protect the mechanism from corrosion. The instrument called a *gas governor*, should be added to the meter, for the purpose of correcting any irregularity in the flow of the gas. The patentees do not claim by this patent the gas meter, and gas governor, nor their combination with clock-work, but *that combination* of the

gas meter with clock-work, or with the gas governor, but for the obtaining of a supply of gas from the street mains, which is made up by them with parts of the machinery of their engine, subject to the rights of the patentee of the gas meter, and gas governor.

The use of gas to this engine, and the application of the means described for obtaining a supply, enable the patentees to furnish a compact power engine, not requiring the constant attendance of a fireman, and adapted to situations where sufficient space could not be appropriated for an engine requiring a boiler, and coal-house, and where the smoke of such engines might be deemed a nuisance.

Fig. 3.



A mode of applying gas for heating the differential vessel, is shewn at fig. 3: *d d* is a hollow ring surrounding the differential vessel, and communicating with the tube by which the gas is supplied; this ring is perforated, for the emission of jets of gas to flow when ignited all around, and against the differential vessel, or nearly so; *c c* is an iron casing for directing the heat to the differential vessel, which casing is open at the bottom, for the admission of air, having also an opening at top to serve as a chimney or flue; *k* is an outer covering of polished metal, of about 2 or 3 inches more in diameter than the casing *c c*, for the purpose of lessening the radiation of the heat.

The working cylinder *h*, may be kept hot by means of a current of heated air, being conducted to it from the flues of the differential

vessels; the arrangement for which being so easily understood, it is purposely omitted in the drawings. In fig. 3, *t t* represent the differential vessel, as placed in a cistern of cold water, with a constant current running in at the bottom *u* against the differential vessel, and passing off at the top *v*. In situations where a sufficient quantity of water cannot be obtained for procuring the desired effect in this way, other well known means of cooling vessels may be resorted to.

To increase the power of the engine, it is proposed to increase the density of the air, by a common forcing pump worked by the engines and connected with the differential vessels, and as some leakage of air may be anticipated at the high pressures, the addition of the pump is necessary, and may be connected with the differential vessel by the tube *j*. This pump should be provided with any of the well-known means of adapting the length of the stroke to the loss of air by leakage. In starting the engine, this pump may be disengaged from the engine, and worked by hand, for charging the differential vessels with air of the intended density. A safety valve should be connected with the differential vessels, and adjusted so as to let off any excess of air above that which is required.

The speed or power of the engine may be regulated by increasing or diminishing the supply of gas, or other source of heat, by connecting a governor similar to that used in steam engines, with a valve or stop cock in the pipe supplying the gas, or with a damper placed in a flue, or with valves placed in the pipes *l m*, and *l n*, regulating the ingress or egress of the rarefied air to and from the working cylinder. The differential vessels and transferers, may be constructed upon the same principle in various forms, either cylindrical, cubical, or spherical; and they may be placed in vertical, inclined, or horizontal positions. The patentees mention several modifications in their specification, which it is unnecessary here to describe. The deviations in the shape, will of course require different methods of applying the heat. The patentees do not confine themselves to the use of gas only, as the source of heat, in some cases even steam may be adopted as a medium of communicating caloric, but a preference is given to the apparatus, particularly described and delineated in the engravings.

SUSPENSION TRUSSED GIRDERS.

TO THE EDITOR.

Sir,—In perusing the last part of your interesting journal, I perceive you have given publicity to a suspension truss, by Mr. Conder. The idea of forming a truss on the suspension principle occurred to me about fifteen months ago, which I then immediately put in practice, by constructing a model on a bold scale: and the same was exhibited to the Messrs. Bramah, and several others, at their manufactory, Pimlico, where my original model remains. Not having had an opportunity of applying it advantageously in practice, is the reason that it has not as yet gained publicity. The object I had in view, was to obviate the inconvenience arising from the

buckling (as it is technically termed) of the compressed parts of a truss, and of making use of the timber. I have several modifications of the same principle; and it is rather singular, that Mr. Conder should have adopted precisely the same arrangement, although it is the most obvious one, when the principle is conceived. I do not wish to detract from the merit of Mr. Conder's idea, but do conceive I have a claim to the priority of the invention.

I am, Sir,

Your most obedient,

A. H. Renton, C. E.

Note.—We have individually no doubt whatever of the correctness of the preceding statements of our correspondent, but we think it would have been more satisfactory to the public, had Mr. Renton sent us a sketch of the model alluded to.—Editor.

IMPROVED LOG SHIP,

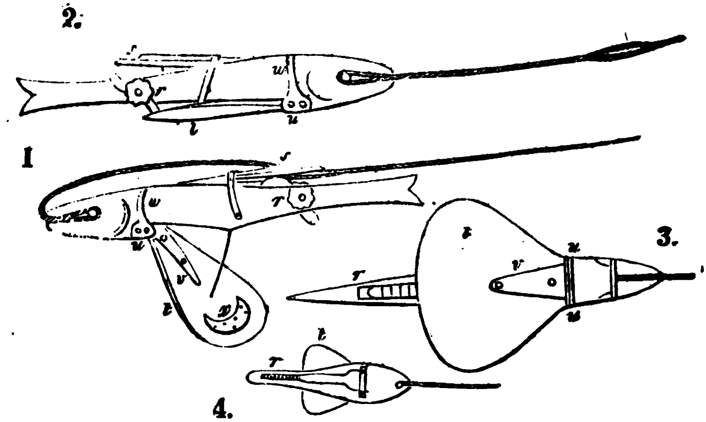
By Mr. James Hookey, Midshipman, R. N.

The advantages gained by this invention are, that it gives the distance the ship runs more correctly, as it remains more stationary in the water than the one generally in use; and when required to be hauled into the ship, by giving it a sudden jerk, the toggle swivels round, and disengages the line from the spring, in consequence of which, the log-ship reverses its position, and may then be pulled into the ship with the greatest ease.

With respect to the lines, Mr. Hookey recommends, that they be saturated in a composition of oil, which makes them more buoyant and pliable, and prevents kinking; it likewise prevents their contracting, which in new line is about 20 feet in 50 fathoms. As many serious accidents are likely to occur by getting a false depth of water, in consequence of the contraction of the line attached to the lead, it becomes an object worthy of attention to prevent the possibility of such accidents taking place.

The log is formed like a fish. Fig. 1 represents one, running out, and fig. 2 the same in the act of being pulled in; *r* the toggle, *s* the spring; the eye of the line is put on the toggle, which is then pushed under the spring; the flap board *t* falls down, and the fish runs out. When the line is taught, a sudden jerk will make the toggle pass the spring and let go the line; the fish then swings round, the flap-board *t* closes, and it is easily pulled in.

Fig. 3 shews the under side; the flap-board *t* is jointed to the fish by the strap of the copper *v*, which passes round a pin *l l l l*, and this pin is held by the copper strap *w*; the line is attached to the log by a loop which goes in at the mouth, and is held by a peg which forms the eye; the flap-board *t*, if made of copper, has a piece of wood rivetted to it in the middle to stiffen it; if made of wood, a slip of lead or copper *x* is rivetted on, to make it heavy enough to drop down readily when thrown into the water. Fig. 4 is a top view of one made thin and wide, like a flat-fish; the spring *s*,



which holds the toggle, is underneath, beneath the fish and the flap-board *t*; the spring may be above or below in either case.

The following are the instructions given for using the log-ship.—The eye in the line is to be put over the toggle, on the tail of the fish, and when the line is all run out from the reel, and it becomes taught, by giving it a sudden jerk, the toggle will swivel out; the fish will then reverse its position, float on the surface of the water, and may be hauled into the ship with the greatest ease. When it is necessary to shift the line at the head of the fish, knock out the peg that forms the eye, and the line will then disengage itself; and in attaching another line, make an eye in it, and pass it into the mouth of the fish perpendicularly, through which put the peg that forms the eye, and it will be quite secure.

The inventor strongly recomends that all log lines, and lines to the lead should be saturated for one hour in linseed and lamp oil, three fourths of the former, and one fourth of the latter well mixed together, after which hang them up to dry; contraction will thus be prevented, and they will be pliable and buoyant.

The large Silver Medal was presented by the Society of Arts to Mr. Hookey for this invention, and a model of which is placed in the Society's Repository.—*Trans. Society of Arts,* vol. xlv.

STEAM ENGINE BOILER AND FURNACE,

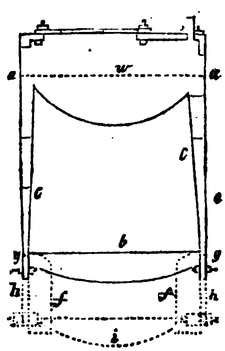
Adapted to the use of either anthracite or bituminous coal, and particularly applicable to locomotive engines. By S. H. Long, Colonel of Topographical Engineers, Philadelphia.

TO THE EDITOR OF THE FRANKLIN JOURNAL.

Sir,—Having devoted some attention to the subject of a boiler, or steam generator, adapted to the use of mineral coal, both anthracite and bituminous, as fuel for the steam engine, and especially for the locomotive engine, I beg leave to submit the result of my

investigations in relation thereto; they are comprised in a brief description of the apparatus proposed for the purposes above mentioned, and illustrated by a drawing hastily executed.

The objects in view, are the construction of a boiler that shall present the largest surface to the action of the heat, with the smallest quantity of water, and such an arrangement of the fire-place, as will subject the fuel to the strongest draught, and at the same time apply the largest proportion of the heat to the production of steam. The manner in which I propose to accomplish these objects, is as follows.



The accompanying figure, (plate 2, fig. 2,) exhibits a vertical section of the boiler. AA represents a cylinder of any convenient dimensions, formed of sheet iron $\frac{3}{16}$ or $\frac{1}{4}$ inch in thickness, rivetted in the usual manner, and constituting the exterior of the boiler. B, the head of the boiler, furnished with a *man-hole* and cap, and also with an aperture, through which the steam is to be conveyed to the working cylinder of the engine. C, a conical frustrum with a concave summit, formed of sheet iron, of the thickness above mentioned, constituting the interior of the boiler, and at the same time serving as a fire-place. The diameter of its base is about two inches less than that of the cylinder A, while that of the summit is about six inches less; so that the thickness of the circular sheet of water contained in the boiler, is one inch only at the bottom, and about three inches at the top of the frustrum, while the depth above the latter does not exceed three inches. The frustrum and cylinder are firmly connected at bottom, by means of a ring *a*, of cast iron or other metal, and rivets passing through them respectively. The ring *a* must extend below the cylinder and frustrum, far enough to receive a flanch or step, for the support of the grates *b*, which are to be adjusted to the circular area of the fire-place.

D the door, 10 or 12 inches in diameter, through which fuel is to be administered. It is formed by means of a sleeve of sheet iron, firmly rivetted to the cylinder and frustrum, through the sides of which last, is a corresponding perforation of the same diameter.

E the flue, constructed in the same manner as the door, and communicating with the chimney.

The flue may be constructed in such a manner, as to pass or wind upon the outside of the cylinder, and apply its heat exteriorly to the boiler, and then communicate with the chimney. The boiler may be sheathed on the outside with pine-staves, or any other non-conductor.

The dotted line *w*, represents the surface of the water in the boiler, the space above serving as *steam-room*. The tube through which the water is conveyed into the boiler, may enter the latter, at any convenient point below the surface *w*.

F represents a prolongation of the ring *a*, adapted to the use of anthracite, which cannot readily be ignited, in contact with a conductor at a low temperature. The depth of the ring should be about one foot. It must be lined with fire-bricks, or lute of suitable thickness, as represented at *ff*, resting upon the grates *g*, or otherwise supported. The fire-place in this instance will be situated below the boiler, and included within the ring F. The whole of the heat that may be generated must ascend through the boiler, and a large portion of it be applied to the production of steam.

The flanch, or step, for the support of the grates, will be circular, and may be inserted within the ring *a*, and sustained by screw bolts or rivets passing through it and the ring, as represented in the figure.

Any number of boilers of the description above given, may readily be combined, and made subservient to the production of steam, sufficient for the supply of the most powerful engines.

If we assume three feet for the height of the frustrum, 34 inches for its greatest, and 30 inches for its least diameter, (and three feet for the diameter, and four feet for the height of the cylinder A,) the surface exposed to the action of the heat will be about 28 square feet, nearly equal to that of a locomotive engine of the ordinary construction, while the weight of water contained in the boiler, will be less than one third of that required for the common cylindrical boiler.

Very respectfully, &c.

Philad. July 4th, 1827. S. H. Long.

REVOLVING LIGHTS FOR STEAM-BOATS.

By J. Hawks, Esq. of Upper Thames Street.

A fatal accident that occurred on the coast of Scotland, by two steam vessels running aboard each other, suggested to Mr. Hawks the necessity of distinguishing this class of shipping, from sailing vessels under way at night. He proposes that a frame like two arms of a windmill, should be fixed on a pivot, projecting from the chimney, "or a strong upright spar," in such a manner, as to receive a movement of rotation from any convenient part of the steam-engine. At the end of each arm is suspended a lantern, so

that the two opposite lanterns will display two opposite lights, moving round a centre, and describing a circle, the plane of which is at right angles to a line, drawn from head to stern of the vessel. —*Trans. Soc. of Arts.*

Most of our readers will recollect seeing in our third volume, page 152, *an apparatus for "preventing steam-boats from running foul of each other," similar to Mr. Hawks's plan above described, which was communicated to us by the inventor, Mr. James Day, of Kingsland Crescent, on the* 17*th November,* 1825. *We feel it our duty to notice this circumstance in justice to our correspondent, to whom the priority in this very useful invention belongs, as is handsomely acknowledged, in the following extract from the preface to the last volume of the Transactions of the Society of Arts, page* 27.

"With regard to Mr. Hawks's revolving light for steam-boats, it appears, *on subsequent inquiry,* that a plan similar to the above, but differing in the mode of securing the vertical position of the lanterns, was proposed by Mr. Day, *Kingsland Crescent,* and was communicated by him to the editor of the 'Register of Arts and Sciences,' in which work it appeared, nearly six months prior to the date of Mr. Hawks's communication to the Society. This latter gentleman made the model of his apparatus while he was residing in Guernsey; and there is every reason to believe, that the two plans, though similar, are each original inventions."

From our personal knowledge of Mr. Hawks, we feel assured of the fact, noticed in the concluding observation of the above extract, and our experience has often proved to us, that there is nothing very remarkable in the coincidence of the two inventions.

The shock of any two sailing vessels falling aboard of each other at sea, will not unfrequently sink the smaller one; and the probable mischief to be apprehended from two steam-boats in similar circumstances, is greatly increased, both by the greater velocity of the vessels, and the weakness of their construction.

The following are the regulations relating to this subject, to which the steam-boats navigating the Clyde are subjected, by the trustees of the River, and of the Harbour of the Broomielaw, as printed by order of the House of Commons, May 12, 1826.

When two steam-vessels meet, going in opposite directions, each shall slack its engine, as soon as the vessels come within thirty or forty yards of one another, and shall keep to the left or larboard side.

If two steam-boats are going in the same direction, and the fastest is astern, as soon as the latter comes within thirty yards of the slower-going one, this shall slack its engine, and go to leeward, till the faster has got thirty yards at least a-head.

All steam-vessels at night, or in foggy weather, shall slacken their speed to four miles an hour at the utmost.

All steam vessels shall have a bell, capable of being attached to the machinery, so that in foggy weather it shall be continually ringing.

All steam-vessels shall have a triangular light hung a-head, or

placed in a conspicuous part of the bow of the vessel, from sun-set to sun-rise.

It appears also, from a letter written to Mr. Hawks by Mr. J. Miller, secretary to the Margate Steam-Packet Company, that their vessels have, for the last two years, hoisted a triangular light at the fore-mast head, after sunset.

But sailing vessels occasionally hoist a triangular light, and therefore a mere triangular light, is not a sufficient distinction for steam-boats; but by making the lights to revolve (whether two or three) by attaching them to the machinery, no mistake could possibly arise. It was also mentioned in the committee of the Society of Arts, and the suggestion deserves notice, that a further advantage would accrue, from having the stern half of one of the lanterns green, or any other readily distinguishable colour, as it would serve not merely to point out a steam-boat, but also to shew in what direction she is going, and thus give still greater facility in avoiding her. If, for example, a vessel in her course descries a-head two steadily revolving lights, one of which is white, and the other green, it is evident that a steam-boat is in that place, and going in the same direction as the other vessel; but if both the lights are white, it is plain that the steam-boat is bearing down, and that due care must be taken to avoid her. The same advantage might also be obtained, by causing the lights of every steam-boat to revolve in one and the same direction.

To the foregoing observations may be added, that previously planned by our ingenious correspondent, Mr. Day, by which the rate that the vessels are going, may be estimated by the velocity of the revolution of the lights, (see Register of Arts, vol. 3, page 152, first series:) this is a point of great importance to be ascertained, yet Mr. Hawks has proposed nothing to attain this object, nor even mentioned it, although it stamps a distinctive merit upon Mr. Day's invention.

SCIENTIFIC INSTITUTIONS.

Royal Institution.—Wednesday, the 7th of May, Dr. E. I. Clarke delivered the first of a Course of Four Weekly Lectures on *Botany*.

London Mechanics' Institution.—Friday, the 16th instant, Professor Millington concluded his Course of Lectures on *Hydraulics*,—when it was announced to the Members, that Mr. Toplis would deliver Two Lectures on the *Mechanical Aggregations of Matter*, on the two following Fridays, May the 23rd and 30th;—and then Dr. Birkbeck would resume his Course on *Physiology*.

The Members were also informed that the Fourth Anniversary of the Institution would be celebrated on the 5th of June next, by a dinner at the Freemasons' Hall: the Duke of Sussex having consented to take the chair on that occasion.

MR. PETER CHRISTIE'S FIRST LECTURE ON CIVIL ARCHITECTURE.

Mr. CHRISTIE, after some appropriate observations on the utility and importance of this subject, more particularly to that class whom he had the honor of addressing, gave a definition of the term, and stated the opinion of Pythias, that an architect must be more expert than the most expert of all the workmen employed in the various branches of building. He then proceeded to state what were indispensable in an architect; although, perhaps, none could equal the excellence expected by Pythias. He must possess a competent knowledge of geometry, mensuration, perspective, and plan drawing—he must be well acquainted with the nature of all the materials he intends to employ, and of the soil on which they are to be erected. He must be skilful in piling and planking, and be thoroughly acquainted with the principles of ventilation and draining.

Mr. Christie then explained the nature of plan drawing, and illustrated his remarks by beautiful and appropriate diagrams. Some paste-board models of buildings, roofs, and geometric figures were then exhibited, and the art of constructing them briefly explained. The lecturer proceeded to give an interesting sketch of the progress of the science, from the first construction of huts and tents, to the establishment of the regular and systematic orders of architecture. No nation or people, however remote or uncivilized, were without places of shelter. The Icelanders had dwellings formed of a whale's ribs; the Esquimaux had a hut, built of snow, with a dome of ice; the wandering Arabs a portable shelter, formed of felt or skin. The first regular construction of a dwelling for the habitation of man appears to have been a triangular wooden hut, formed of stakes, with branches of trees intertwined: the inconvenience of this form soon became apparent, and the cubic form hut was introduced. The subsequent more elegant structures were then adverted to, and illustrated by models.

MISCELLANEOUS INTELLIGENCE.

ON THE RELATION OF WATER TO HOT POLISHED SURFACES.—"The tranquil state of a drop of water in a very hot silver tea spoon, or metallic capsule, with the comparative lengthened period of its evaporation, are facts well known, and are usually explained by admitting the intervention of a film of vapour which prevents the contact of the water and the metal, and so interferes with the transmission of heat. Mr. Perkins thinks he has proved that other causes are importantly active; but without referring to the opinions on this point, I have thought it may be interesting to point out another form of the experiment which I have often witnessed. A large trough of water being placed under the fire bars of a powerful furnace, the water soon became heated by the fall of ashes into it, and the communication of heat both by radiation and condensation. With the ashes fall numerous small globules of slag highly heated, and these will frequently remain on the surface of the water, slightly depressing it at the place, and will float quietly about for several seconds, as drops of water or alcohol, and other substances, do upon masses of their own fluids. During this time they retain a high temperature, cooling by comparison very slowly, but on a sudden, when at a certain point, they come in contact with the water, hiss, are quenched, forming steam, and instantly sink. When these globules have been afterwards examined, they have been found now and then hollow, but generally solid, highly polished, very round, and heavy, as slags ordinarily are."—*M. F. Quarterly Journal.*

CANTHARIDES.—The insect on which the highest degree of the blistering quality exists, is a species of coleoptera, of the genus mylaber; very nearly that which has received from Linnæus the name of the plant—on the flower of which it is to be found—the endive. From certain passages in Pliny, it appears that this is precisely the species to which the Romans gave the name of *cantharis*, borrowed from the Greek. Dioscorides establishes the same fact.

MEDICAL VIRTUES OF THE SPIDER'S WEB.—Dr. Jackson, in his work on fever, pronounces that the web of the spider prevents the recurrence of febrile paroxysms more effectually than bark or arsenic, or any other remedy employed for that purpose. It is administered in pills of 5 grains each every fourth or fifth hour, the patient being previously prepared by the usual evacuants. It is said to be useful also in spasmodic affections of various kinds, asthma, periodical headaches, and general irritability; also as an application to ulcerated and irritable surfaces. The web should be that of the black spider, found in cellars, and dark and damp places. It has been for years used as a remedy for agues, by the good old women of the West of England and elsewhere.—*Monthly Mag.*

PURIFICATION OF ALCOHOL.—A prize was offered by the Royal Academy of Brussels to the person who should prove upon what the differences between alcohol, extracted from various substances, as fruits, grain, roots, sugar, &c. depended. This was obtained by Mr. Hensmans, who was led, by numerous experiments, to conclude that the alcohol was always identical, but that the difficulty more or less great, always found in rectifying it, as well, also, as the difference in taste, depended upon the presence of a fatty matter, and a little acetic ether. The fatty method when alone, may be separated by several distillations, but the acetic ether is not removed in this way. It is better, in every case, for the removal of both, to add a little caustic potash, or soda, to the alcohol to be rectified. Carbonated alkali does not act with sufficient energy.—*Bull. Univ.*

PLAGUE.—At Cephalonia, mercury has recently been employed as a preservative against the plague.

DESTRUCTION OF SNAILS BY COMMON SALT.—M. E. Rousseau had applied common salt as a manure to a small piece of garden, and remarked that were snails had come in contact with the salt, they quickly died. Wishing to confirm the fact, he strewed the salt upon the ground, and placed a number of snails amongst it: all those which came out of the shells and touched the salt immediately threw out a greenish, globular froth, and in a few minutes were dead.—This fact may be turned to account by agriculturists and gardeners. —*Bulletin Universelle.*

VALUE OF SALT AS A MANURE.—"By way of experiment, I manured one small patch of the ground with mud only, another with mud and lime; but the compost of salt and lime produced a crop of nearly or quite double the bulk of that grown from either of the other experiments."—*Newspaper Correspondent.*

Locusts.—In some parts of Russia, the "plague" of locusts so formidable, that there is often a grand battue after these depredators. Last year, on the estate of General Cobley, on the borders of the sea of Okrakow, they marched in 24 columns, and destroyed the crops; when he collected all the peasants on his estate, and those from the neighbouring country, amounting to 500 persons. They were armed with pitch-forks, spades, drums, and bells: and thus equipped they commenced their march against the locusts, which they soon compelled to retreat, and pursued into the sea, where they were forced to jump into the water.—*Wilson's Travels in Russia.*

Large Boats.—At Riga, they have very large flat-bottomed boats in the river. They are very rudely constructed, being formed of logs of wood, across which are laid spars. They are not decked, but five enormous beams extend from side to side to keep them firm. They have also an arched roof, formed of spars covered with straw matting, which is piled to a great height with hemp. These extraordinary boats, which are from 100 to 150 feet long, and 40 broad, look like large floating masses so top-heavy, as to appear likely every minute to upset. As soon as their cargo is disposed, they are broken up, which is speedily done on account of the slightness of their construction.—*Ibid.*

The Tourmalin.—A fact has been discovered respecting this stone (the antient lyncurium) which may have an important effect on the atomic philosophy. While the tourmalin is only of a certain length, it is electrical by being heated and cooled; as the length increases that capability diminishes, until it ceases entirely. If the inverse of this law takes place, the atoms of the tourmalin must acquire considerable electrical polarity by the slightest changes of temperature.

English and French Measures.—M. M. Matthieu, Legendre, and Dulong, lately made a report to the *Academie des Sciences*, on M. Francour's memoir relative to the comparison between the French and English measures.

The proportion of the imperial English yard to the French metre was obtained with great precision by an intermediate comparison of the two standards. The metre = 39, 37079 English inches, and the yards = 0, 91438348 of a metre. The ounce was determined = 31, 0913 grammes: a result considered to be within from two to four millegrammes of truth.

Power Looms.—The estimated number of looms propelled by by water and steam power in the united kingdom, including those in preparation for working previous to the stagnation, as near as any calculation can be made, is 58,000. The average produce, taking it at 22 square yards a day, makes 1,254,000, or 1741 yards a minute; weekly, 7,524,000; monthly, 31,300,000; yearly, 276,200,000. Allowing 6 yards to each person for yearly consumption, will supply 62,700,000, and will cover 62,700 acres of ground and in length would extend 213,750 miles, which would reach 71 times across the atlantic ocean, or ten times round the globe.

Population and Generation.—Father Peters, the Jesuit, calculated that in 260 years, four men might have 268,719,000,000 of descendants. Enough to people many such worlds as ours! Sir W. Blackstone shows, that in twenty generations every man actually has 1,048,576 ancestors. Thus, the provisions of nature are made against every contingency. In the animal world, 342,144 eggs have been found in a carp only 18 inches long; and 600,000 have been reckoned in the roe of a salmon.—*London Weekly Review.*

Fall of Aerolites.—On the 26 Sept. (8 Oct.) last a shower of aërolites fell near Belestok, between 9 and 10 o'clock in the morning. The inhabitants were alarmed by an extraordinary noise which proceeded from a large black cloud that hung our over their heads, and which continued for three, (some say six minutes,) resembling a running fire of musketry. The noise which was heard by several persons at the distance of fourteen wersts, was succeeded immediately by a shower of stones, of which only four were picked up; the largest weighing four pounds, the smallest three quarters.—*St. Petersburgh Gazette.*

Abyssinia.—The celebrated traveller, Edward Rüppel, is on the point of setting out for Abyssinia, for the purpose of exploring those parts which have not hitherto been visited by any European. The Senate of Frankfort, by an unanimous resolution, has granted him a thousand florins of annual income for the ensuing 7 or 8 years, as well in acknowledgement of his former services, as to enable him, agreeably to his wish, to continue his scientific travels and researches.

LIST OF EXPIRED PATENTS.

Continued from page 96.

LEATHER.—To Sparks Moline, of Leadenhall Street, London, for an improved method of tanning leather. Dated March 28, 1814.

MILLS.—To George Smart, of Westminster Bridge, Surrey, for improved machinery for grinding corn. Dated April 1, 1814.

MUSICAL INSTRUMENTS.—To James Wood, of New Compton Street, Middlesex, for improvements in the german flute, clarionet, and bassoon. Dated April 1, 1814.

NAILS.—To Joseph C. Dyer, of Boston, United States, and of the Adelphi, London, for improvements in machinery for manufacturing nails. Dated April 1, 1814.

STEAM ENGINE.—To J. W. Rastrick, of Bridgenorth, Salop, for a new construction of steam engine. Dated April 1, 1814.

STOVES, &c.—To Isaac Mason, of Wellen Hall, Stafford, for a method of making stamped fronts for register stoves, fenders, &c. Dated April 1, 1814.

MAP ROLLERS.—To John Roberts, of Brownlow Street, Drury Lane, for map rollers, carriage blinds, &c. Dated April 7, 1814.

CARRIAGES.—To William Whitfield, of Birmingham, for certain improvements in carriages. Dated April 7, 1814.

EARTHEN PIPES.—To John Read, of Horsemonden Kent, for means of raising and conveying water or other fluid, by pipes of purified earth. Dated April 18, 1814.

SODA WATER PUMPS.—To David Grant, of Pickett Street, Strand, for an apparatus for drawing off soda water, &c. Dated April 27, 1814.

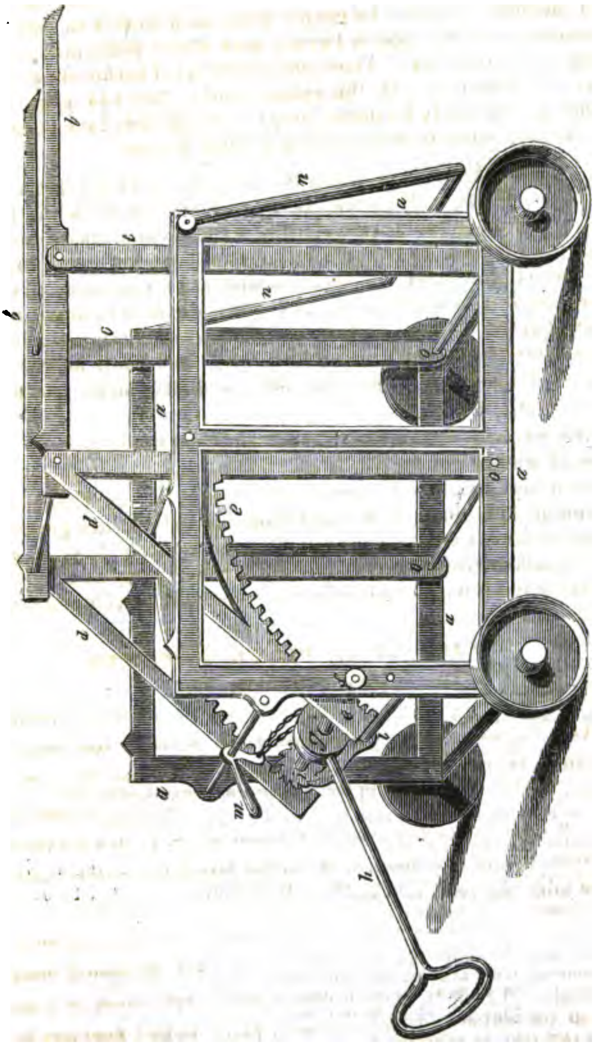
CARRIAGE WHEELS.—To Lewis Gompertz, Esq., of the Oral, Kensington, for improvements in carriages, and substitutes for wheels for carriages, and other machines. Dated April 27, 1814.

MUSIC.—To Barnard Looker, of Sackville Street, Dublin, for an apparatus for facilitating the acquirement of proper execution on the piano. Dated April 28, 1814.

TO OUR READERS AND CORRESPONDENTS.

The Ball and Socket Joint has been already applied to the very purposes mentioned by H. R.

W. W.—and An Anatomist—are under consideration.



PATENT "RIDING-TRUCKS,"

By S. W. Wright, Engineer, of London Road, Surrey.

One of our contemporaries having given an account of this invention in a confused and unintelligible manner, we have been induced to notice it rather earlier than we had intended, out of respect to the talents of the inventor, who, notwithstanding the

injudicious combinations introduced into his Crane, (described in our 11th number, present series,) has, in the present instance, proved himself to be a tolerable mechanic. The machine, it is true, is nothing but a truck, but it is a truck that answers the purpose intended, viz. that of conveying hogsheads of sugar from place to place, then giving them a gentle lift upon other hogsheads (called "riding them") so as to make a double tier one over the other; an operation heretofore performed by other mechanical means, though not so conveniently nor so expeditiously. So sensible have the Directors of the West India Docks been of the great advantages attending the employment of these trucks at their warehouses, (where they are extensively used,) and so grateful have they been for the benefits thereby conferred upon the establishment, that, according to universal report, they have presented Mr. Wright with a clear bonus, over and above his contracts, of *One Thousand Pounds!*

This is acting in a spirit becoming a great and flourishing public body, and we hope to see it exercised in a similar manner to other individuals, who, while they are introducing improvements of equal importance to particular interests, are at the same time advancing the cause of science generally.

Before describing this machine, it is proper we should state that the drawing of the illustrative engraving which precedes this article, was made entirely from memory, after seeing the truck at work in one of the warehouses of the West India Docks; but of its correctness our readers may entirely rely: indeed, the machine, though not quite so simple as it might be made, has so little of complexity about it, that there is not the slightest difficulty in making a drawing of it under those circumstances.*

a a a a shows the frame of the truck mounted upon four wheels on which it runs; *b b* is the skid upon which the hogshead is raised into the position represented; *c c d d* are levers supporting the skid, and turning upon fulcrums at *o o*, to which are attached two toothed sectors *e e*, that are acted upon by two pinions fixed near to the ends of the axis *f*: this axis carries a click-box *g*, which is worked by a lever *h* attached to it: *i* is a ratchet wheel on *f*, *l* a pall, acting on the same to prevent it receding; *m* a bent lever, for lifting by intermediate chains the palls and click, which allows the skid to descend

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* There may be difficulty, however, to such men as the Editor of the London Journal, who, arguing from his own incapacity, stated that the thing was impossible. We allude to his malicious attack upon us, for giving what he chose to consider a *premature* publication of his patron's (Mr. Wright's) Crane, *at that time in public use* at the West India Docks. On that occasion we gave so accurate a drawing of the crane, that Mr. Newton thought proper to say that we had obtained a "sketch by stealth through some of the workmen in Mr. Wright's employment." For so base and unfounded an assertion we for some time had serious thoughts of making the libeller answerable before a jury, (see Register of Arts, vol. i. N. S. p. 201,) but it was considered that the expressions would admit of such great latitude of interpretation, that the intention was not persisted in. We now, however, take this opportunity of calling upon him publicly, to state precisely, in the plainest terms, what he did mean to insinuate, when we shall know how to treat the matter.

to the level of the upper side of the frame *a a*; *n* is a handle for men to draw the truck. There are *two* ratchet wheels, and *two* palls, though only one of each can be seen in the perspective view given.

A crane is employed to lift the hogsheads upon the truck, the latter is then wheeled off to the pile, where the hogshead is raised by *alternately* raising and depressing the lever *h*, which turning round the axis *f*, causes the pinions fixed upon it to raise the toothed sectors and levers, that support the skid; a re-action being prevented by the palls falling into the teeth of the ratchet wheels as they turn round.

We object, generally, to an intermitting motion where a continuous one can be applied; and we can see no difficulty in applying it in the present instance by the introduction of winches in the usual way: but were we to form an opinion of Mr. Wright's notion on the subject, from his wedge and lever crane, we should say that he has a great predilection for an intermitting motion to produce a continuous effect; a practice not countenanced by other mechanics since the invention of toothed wheels.

We shall take leave to propose at some future opportunity some modifications of the apparatus, which will not only simplify but much strengthen it, and at the same time reduce its cost.

PATENT 'LITHOPHANIC, TRANSLUCENT, OR OPAQUE CHINA,'

By Robert Griffith Jones, of Brewer Street, Golden Square.—*Enrolled May*, 1828.

The subject of this patent is the invention of a foreigner, who has communicated it to the patentee, Mr. Jones. The specification does not very clearly set forth the precise object of the invention, although the manipulations and the whole process of executing it are very minutely described; the reader being left to infer, after a perusal of the specification, that the patentee proposes the introduction of a new and elegant manufacture of porcelain, in which designs and pictorial representations generally are exhibited solely by the effect of light transmitted *through* the subject, formed of a semi-transparent substance. In ordinary porcelain or china, the proper effect of the *design* is not seen by being viewed against the light, as the lights and shades are produced by pigments laid on the surface in the ordinary manner of painting. In those articles of porcelain, which have figures and designs in bas-relief, the real forms of the objects are observed; but in the *Lithophanic* China the projections and cavities of the subject have no resemblance to the objects intended to be represented, when viewed in any other manner, than against the light. The effect is therefore produced solely by the variations in the thickness of a semi-transparent substance, the projections or thickest parts being the darkest shades, and the deepest cavities or thinnest parts the lights. This effect may, however, be *heightened* by subsequent colouring or tinting if desired.

The first part of the process consists in modelling the design in

wax, in which the mode of operating is very similar to that adopted by modellers generally; but a great degree of taste, skill, and judgment are required to produce that beautiful effect which this art is susceptible of. A glass plate, of the size of the intended subject, is prepared, with a border or wall of putty laid round upon the edges; on this is poured a thin stratum of melted wax, when the plate is inclined, so that the wax shall accumulate to a greater thickness where the shades of the subject are to appear, and be of the least thickness where the lights are intended to occur. The brightest lights being thus prepared at first, the artist proceeds to lay on patches of wax wherever necessary, to increase the opacity by degrees; and when strongly-defined objects are required, plates of wax are cut out from pasteboard patterns or models of the object and laid upon the plate, to which they are made to adhere by heat. During this part of the process, the scraper and other convenient tools are used, in the manner of the modeller in wax, to scrape, pare down, and shape the various parts of the work, uniformly laying on the substance the thickest in the darkest parts of the design.

Suppose, for instance, a landscape be the subject, the sky and clouds are first formed; this is effected by agitating the glass plate containing the fluid wax, and by blowing upon it with the mouth, so as to produce a waved or clouded appearance. The faintest objects, such as distant mountains are next attended to; these are produced by additional portions of fluid wax, scraping, and cutting away the superfluous parts when cold, and shaping them according to the fancy of the artist, or to the design which he may be copying; the brightest tints (as the edges of clouds, or those of distant mountains,) are produced, by melting the parts with heated irons, so as to reduce the stratum of wax to an extreme thinness. In putting in the trees, and other opaque objects, the wax is poured on more liberally, or laid on in lumps, or by cutting out portions from plates of wax by means of pasteboard models, so as to have a defined outline; in the foreground, where the objects are the most prominent, abrupt, and strongly marked, the same process is observed, increasing the thickness to the greatest degree in the darkest parts, making deep incisions for bright lines, and great cavities for broad lights. It must be evident that no very particular directions can be given for this part of the process, as the main effect must depend upon the taste and skill of the artist, we shall therefore proceed to notice the next operation.

This is simply to cast from the wax model described a mould in plaster of Paris, which is to be performed exactly in the same way as plaster casts are usually taken. This cast, being (obviously) the reverse of the wax model, the thick raised parts of the wax become the deep hollows of the plaster; consequently, to give a bolder and clearer effect to certain parts of the design, the cavities in the plaster may be deepened, and various parts may be cut away, shaped, and finished with great facility. To give the effect of iron railings, or other lines and tints that approach to a black, deep acute incisions are made in the plaster with steel points and scrapers, so as to fill

up the details of the picture, and give an intensity of shade, and a sharpness of outline wherever desired.

In this state of the plaster mould it is ready to be used to take casts from in porcelain clay, which is subsequently vitrified in the usual manner to obtain the requisite transparency; whilst, in the state of biscuit the subject may, if desired, be coloured and tinted to beautify the effect. Thus is produced (with or without the colouring) the *ordinary Lithophanic, translucent, or opaque China.*

There is, however, an additional process to be gone through in getting up very highly finished and elaborate designs. After a plaster mould has been taken and worked up as described, a casting from it is to be made of metal, the surface of which is to be *engraved,* by which means many fine touches may be introduced, and the finishing of the work generally be accomplished in a very superior style. This metal cast, it will be noticed, is the reverse of what it should be, for forming the porcelain within it; consequently, one or more casts are taken from the metal in plaster of Paris, which then become the true moulds for forming the *finer kind of Lithophanic, translucent, or opaque China.*

PROTECTING TURNIP CROPS FROM THE FLY,

By Mr. Charles Poppy, Jun., of Witnesham, near Ipswich.

Turnips are the basis of that improved mode of husbandry which originated in Norfolk, and has now been adopted in most of the light lands in the kingdom: but a small insect, called the *turnip fly,* destroys the plants on their first coming up, occasioning large bare spaces in the fields. and not unfrequently carrying off the entire crop. When this happens at so late a period of the year as to preclude the possibility of taking the chance of a subsequent sowing, the plans of the farmer are deranged, and he is often obliged, at a great sacrifice, to dispose of part of his live stock for want of food for them.

The Society of Arts have for several years offered a premium for the best mode of protecting turnip crops from this their natural enemy; and Mr. Poppy's plan, corroborated as it is by actual experiment, and involving but little expense, appears well worthy of more extended trial, and it is hoped of general adoption.

When two kinds of turnip are sown in the same field, those which are the most tender and succulent will chiefly suffer from the fly. A like distinction will be observed if only one kind is sown, but the seed is unequally scattered: those plants that rise in clusters protect one another from the sun and air, and offer a more agreeable food to the fly than those which come up at greater respective distances. Reasoning from these well-known facts, Mr. Poppy was induced to drill four acres on his own farm, employing one pint of Swedish turnip seed per acre for those rows intended to stand for a crop, and half a peck of common turnip seed on the rows alternating with the former, and intended to attract the fly from them. The

result was, that the thin-sown Swedish turnips were not sensibly injured by the fly, while the thick-sown ones were quite black with swarms of this insect. After the Swedish turnips had got into the rough leaf, the danger from the fly being over, the rows of common turnips were ploughed in, and the crop being afterwards managed in the usual way, turned out very good; whilst all the other turnips in the parish, sown at the same time in the usual manner, totally failed. Another experiment was made in the neighbourhood of Blandford, in Dorsetshire, the result of which was the only good crop of turnips obtained during the last year in that part of the country.

The Gold Ceres' Medal of the Society of Arts was presented to Mr. Poppy for the communication of his method of protecting turnips from the fly, the interesting details of which are given in the forty-fifth volume of the Society's Transactions.

PATENT RECLINING CHAIRS,

By Robert Daws, of Margaret Street, Cavendish Square.

This is an arm chair, having the ordinary appearance, but rendered capable, by pressure on a spring, for the back and arms to fall back, and assume such an inclination as may be most agreeable to its occupant, whether it be for the comfort of invalids, rest for the weary, or indulgence for the lazy.

The back of the chair or couch is attached to the hind legs, at the back of the seat, by hinge joints; the arms are also attached to the back in like manner by joints, and the lower extremities of the arms (which are usually firmly fixed to the frame of the seat) have tenons which slide in long mortices, in which they are confined by cross pins. By this arrangement it will be seen that the back and arms may be freely moved; but to retain them at any required inclination, a rack is fixed to the morticed groove, into which a pall drops, and secures it wherever it is placed. To allow of the inclination of the back and arms being altered at pleasure, a small rod and spring are pressed upon, which relieves the rack of the pall, when the tenon slides along the mortice without impediment, until the pressure on the spring is taken off, when the back is immediately fixed in the position it assumed at the time.

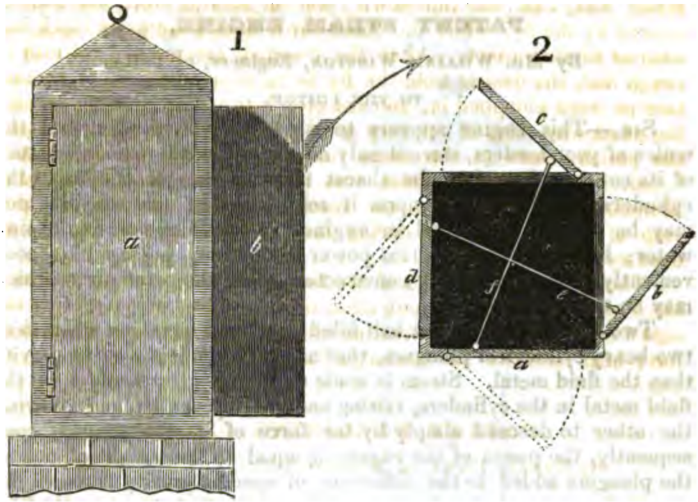
SCOTCH SMOKE COWL.

TO THE EDITOR.

Glasgow, April 22nd, 1828.

Sir,—Desirous to contribute my mite to a work that affords me so much useful information, I send you a description of an apparatus very common in this city for preventing the return of smoke down the chimneys, which it effects very successfully.

Fig. 1 represents an elevation, and fig. 2 a plan or horizontal section of the contrivance, which consists of a quadrangular box of



wood or sheet iron, surmounted with a pyramidical cap, which is placed (as exhibited) over the top of the brick flue. There are four doors to it, *a b c d*; those opposite to each other are connected by a jointed horizontal rod: thus, *a* is connected to *c* by the intermediate rod *f*; and *b* is connected to *d* by the intermediate rod *e*. By this arrangement it is apparent, that when the wind closes that door opposed to it, the one connected to it is opened for the smoke to escape uninfluenced by the wind. The figures exhibit both *a* and *d* closed, therefore, *b* and *c* are open; the dotted lines show the effect when the operation of the wind reverses the action.

I remain, Sir, your constant Reader,
LACHLAN M'LACHLAN.

NOTE BY THE EDITOR.—We thank our correspondent for his communication, while we regret that we cannot much admire the subject of it. It, however, affords a satisfactory proof of the imperturbable nerves of our northern friends, to be able to sleep during the eternal flapping and clattering of their smoke cowls. Our objections are not, however, confined to that circumstance, there appear to us mechanical obstacles to its acting well; but we must not set up our theory against experience. Several excellent smoke cowls have appeared in former numbers of the Register; those of our readers who may require such contrivances, had better, perhaps, look at the following, which occur to us, before making their election, viz. L. W.'s, vol. ii. page 54;—J. L. E.'s, vol. ii. page 104;—Ayliffe's, vol. ii. page 313.

PATENT STEAM ENGINE,

By Mr. William Wigston, Engineer, of Derby.

TO THE EDITOR.

Sir,—This engine appears to me to be well deserving of the notice of your readers, were it only on account of the peculiar nature of its construction; but the almost total absence of friction in the cylinders, seem to confer upon it some practical advantages which may be usefully employed in engines of small power for raising water; but an engine of great power could not, perhaps, be conveniently and economically constructed upon the principle,—which may be thus explained.

Two cylinders are about half filled with fluid metal, in which float two heavy cylindrical plungers, that are of rather less specific gravity than the fluid metal. Steam is made to operate alternately upon the fluid metal in the cylinders, raising one of the plungers, and allowing the other to descend simply by the force of its own weight; consequently, the power of the engine is equal to the weight of one of the plungers added to the difference of specific gravity between the other plunger and the fluid metal in which it is immersed. The following description I gather from a copy of the specification lying before me.

Fig. 1, upon the annexed cut, represents a section of the engine taken through the middle, to explain its internal construction. Fig. 2 is a horizontal plan of the engine, supposing the covers of the various cylinders and levers to be removed to facilitate the explanation. This engine is furnished with two separate weights or plungers, which are adapted to be moved up and down, so as to operate in succession, and thereby produce a continued action, similar to an ordinary double-acting steam engine.

a and *b* represent two cylinders or cases of cast-iron, which communicate freely with each other at their lower extremities, in the manner of an inverted syphon; the upper extremities of these cylinders have flanges, which are bolted to the under side of a nozle piece *c d*, by which means the upper ends of the two cylinders are securely united together. The nozle piece, *c d*, has cavities or passages formed in it, for the admission and exit of steam to and from the cylinders; these passages form a right angle in the nozle piece, and terminate in oblong slits or openings in the upper surface thereof, as represented by the dark spaces in the plan, fig. 2, where the opening, marked 1, is shown by the dotted lines, 1, as communicating with the upper part of the cylinder *b*; whilst the opening, marked 2, is shown by the dotted lines 2, as communicating with the upper part of the cylinder *a*; at the same time the centre or middle opening, marked 3, passes downwards through the nozle piece *c d*, and communicates, by the pipe *e*, directly with the atmosphere, when the engine is intended to be worked with high pressure; otherwise, the pipe *e* may serve as an eduction pipe to communicate with a condensing apparatus, such as is generally employed in steam

Fig. 4.

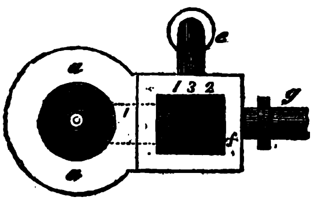
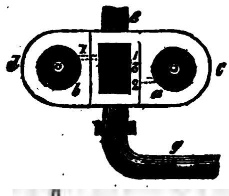


Fig. 3.



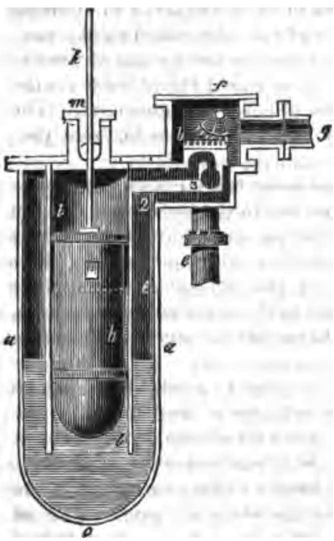


Fig. 2.

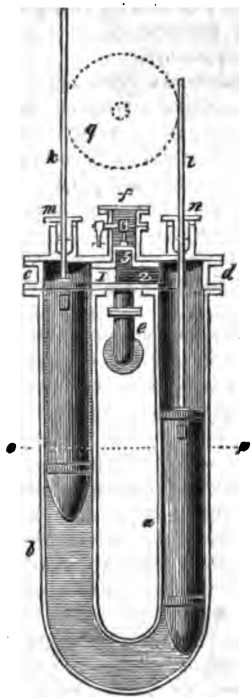


Fig. 1.

engines. The openings 1, 2, 3, are covered by a sliding valve 5, worked by a rack and sector, the spindle of the latter passing through the side of the steam box *f*, of sufficient dimensions to admit of the sliding motion within it. The steam-box *f* which is bolted upon the nozle piece, is furnished with a lid, secured by screw bolts for the convenience of gaining access to the sliding valve and apparatus contained in the interior of the box. *g* represents the steam pipe, which conveys the steam from the boiler. *h* and *i* represent two metallic weights or plungers, which are of such dimensions as to leave about half an inch space entirely round within the cylinders, *a* and *b*; but the rings or hoops represented on the plungers fit the interior of

plunger is unsupported; which would then descend by its own gravity, and carry the end of the working beam along with it, so as to produce an effective stroke of the pump, and be capable of raising a column of water equal in weight (upon the pump bucket) to the plunger. Thus a reciprocating action of the plunger may be kept up as long as a supply of steam is furnished from the boiler. The most advantageous method of keeping the metal in a fluid state, is by carrying a flue round the lower part of the cylinders containing the metal; this flue or passage is a continuation of the engine boiler flue, by which means any degree of heat that might pass off from the boiler flue is advantageously employed.

ESSAYS ON LITHOGRAPHY. NO. III.

(Continued from p. 109, Vol. II. N.S.)

Printing Ink.

This ink differs from that used in typography, in being much thicker. In order to form it, a varnish is made of linseed or nut oil, with which is ground up a certain quantity of lamp black. The older the oil is, the better is the varnish. This ink should not be too thin or liquid; nor must it be too strong or thick. If, when mixed with the lamp-black, it be found to possess the first fault, it will extend itself beyond the lines and points which form the drawing, and be widened still more by the action of the roller, or of the press in obtaining the impressions; and in the end, would adhere to the stone, or fill the spaces between the lines, notwithstanding the water used to prevent these effects; it will also be more readily imbibed by those parts of the stone which have not been covered by the crayons or the ink used in drawing, which will also be softened, and the harmony of the design be destroyed. If it be too thick, if the lamp black be not well incorporated, or any heterogeneous substances be mixed therewith, it will not take well on the delicate points and lines; it will be apt to break them up, or choak the spaces between them, and unite them together, as they will be liable to crush by the force used in taking the impressions.

The same means are used in making this varnish, as are employed in preparing that which is used for letter press: that is, in an iron or a copper vessel, a quantity of oil is poured, sufficient for the varnish it is desired to make; taking care that the vessel is not more than two thirds filled; this precaution is indispensably necessary in order to prevent those accidents which might occur from the oil boiling over. Even in this situation it may suddenly swell up and boil over: it must therefore be carfully watched; and when necessary, removed quickly from the fire, or it would inflame to the imminent danger of every one exposed to its action. When the vessel is thus removed, it is generally placed in a hole prepared in the ground, that it may be more quickly cooled. This preparation should be made out of doors, and in a place where no damage can ensue

from such an accident. When the oil is boiled in a fire-place, there should be close at hand a heap of ashes ready to throw on the fire, to deaden it. Some persons put litharge into the oil, to render it drying; but ink which has been thus prepared, hardens too quickly upon the inking stone and roller; its tenacity will also cause it to adhere too firmly upon the drawing, and may consequently detach its more delicate parts. In preparing the oil, a few pieces of bread are successively thrown into it whilst it is boiling, and these are removed when they assume a brownish colour; onions are occasionally used for the same purpose; the advantage in this proceeding is, however, very doubtful.

The oil requires five or six hours boiling, and even more, when there is a great quantity of it. When it begins to boil, the evaporation is accelerated by stirring it, and ladling and pouring it back into the vessel with an iron ladle, furnished with a long handle. A lid is at first placed on the vessel, to hasten the heating of the oil. The oil is to be inflamed at three or four different times, taking care to extinguish it when it burns too fiercely; this may be done by blowing upon it, by placing the cover upon the vessel, and if necessary, by removing it from the fire. The fire is applied to the oil by means of a piece of flaming wood, or paper, which is brought near to its surface; if the liquid does not take fire, it is proof that it is not yet sufficiently heated. The oil is to be ladled up, and poured back again whilst it is burning. All these operations should be performed with great care, to avoid injury from the fire, and more particularly from the boiling oil, which burns severely wherever it touches.

In order to ascertain when the oil is boiled enough, and the varnish has acquired the requisite degree of consistence, a few drops are allowed to cool on a piece of glass, or on a plate. When the varnish has been allowed to cool, it ought not to be capable of flowing on the body on which it has been placed; when touched by the finger, it ought, on raising it, to draw out into long threads; and the length of these threads indicates the thickness of the varnish. The consistence of the thinnest varnish, should be a little less than that of common honey; but experience alone can teach the exact degree of thickness which is necessary. For lithography, two kinds of varnish are in general prepared; one thick, intended for crayon drawings, the other thinner, for designs in ink; and when it is desired to have one of an intermediate quality, these two are mixed together. These varnishes may be kept in the vessels in which they were made, or in glazed jars; care being taken to cover them closely. If the varnish has been boiled until it is too thick, it may be made thinner, when necessary, by warming it a little, and mixing with it a certain quantity of linseed oil. It may also be tempered without heating it, by rubbing it up with a little oil; observing that only a very small quantity must be used, otherwise it will spread on the impressions, and thus spoil them. A quantity of this varnish, sufficient for a fortnight's work is taken, and in small portions at a time, ground up with lamp-black, by means of a muller; carefully observing to cover it whenever any is taken out for use. The varnish may be thickened, by adding to it a greater quantity of lamp-black.

In order to obtain beautiful drawings, a black of the best quality must be used; the lamp-black found in the shops is greasy, and of a brownish colour; and if employed, will produce impressions which will appear dull and rusty. To avoid this incovenience, that black should be used which is made of burnt, or rather carbonized resin. It is prepared by packing it closely in a crucible, the lid of which is to be luted down with potters' clay; the crucible is then placed in a stove, and covered with lighted chorcoal, and thus left until no smoke can be perceived to issue from the interstices around the cover. This black when taken from the crucible, presents a body sufficiently hard, but friable; it is to be broken on a stone, and pulverized with a muller, before mixing it with the varnish. Some persons mix with the lamp-black a small quantity of indigo, to give more tone to the proofs; this, however, is not necessary, when the lamp-black is of the first quality.

The public taste sometimes requires that prints or designs should be produced in colours. In this case, the colour required is mixed with common varnish. Those which combine with this varnish, are for blues, indigo, and Prussian blue; and for reds, vermillion, and carmine; this last colour requires to be rubbed up with spirits of turpentine, to enable it to incorporate perfectly with the varnish. The ochres, (when they are very fine,) may be used for reds, or yellows; and that of the latter colour, when mixed with indigo, will produce a green. Terra di Sienna gives a brown, &c. The greater number of colours, as they are found in the shops, not being sufficiently free from grit, or other gross particles to produce good ink, it becomes necessary to mix them in fine powder, with a certain portion of water, in which the grosser matter is allowed to subside, and which is then decanted, and left at rest to deposit the washed colour.

[*To be continued.*]

SCIENTIFIC INSTITUTIONS.

ROYAL INSTITUTION.—MARQUIS SPINETO will commence a course of Lectures on the *History of Hieroglyphics and Fable,* on Friday, the 30th of May, which will be continued each succeeding Friday till completed.

LONDON MECHANICS' INSTITUTION.—MR. TOPLIS completed his Lectures on the *Mechanical Aggregations of Matter,* on Friday, the 30th of May, when the Members were informed that the Quarterly General Meeting would be held on Wednesday, the 4th of June, and that, as the anniversary dinner would take place on Thursday, the 5th, there would be no Lecture on Friday, the 6th.

WESTERN LITERARY AND SCIENTIFIC INSTITUTION.—PROFESSOR MILLINGTON has just commenced a Course of Lectures on *Hydraulics* at this Institution, which he illustrates by a great variety of excellent working models of the various water machines.

Southwark Literary and Scientific Institution.—Dr. Epps has completed his Course of four Lectures on *Phrenology*, at this Institution, with which the Members seemed much pleased; and it was announced on Wednesday last, that the Doctor would deliver two additional Lectures on the same subject,—which would be followed by a Lecture on *Prejudices*, by Mr. Chambers.

MISCELLANEOUS INTELLIGENCE.

East-India Varnishes.—The Sylhet varnish consists of two parts of the juice of the *chela* (the *seme-corpus anicardium*), the tree which bears the marking nuts, and one part of the juice of the *jowar*. The articles varnished with it at Sylhet are of the most beautiful glossy black; and it seems equally fitted for varnishing iron, leather, paper, wood, or stone. It has a sort of whitish-grey colour when first taken out of the bottle, but in a few minutes it becomes perfectly black by exposure to the air. In the temperature of this country it is too thick to be laid on alone, but it may be rendered more fluid by heat. In this case, however, it is clammy, and seems to dry very slowly. When diluted with spirits of turpentine it dries more rapidly, but still with less rapidity than desirable. The *tsitsi*, or varnish of Rangoon, is less known than the Sylhet varnish. It is probably made from the juice of the chela alone. It appears to have the same property as the Sylhet varnish, but dries more rapidly. The varnish from the khuso, or varnish-tree, may be the same as the Rangoon varnish, but it is at present considered to be different. The *khuso* grows particularly in Rubboo, a valley on the banks of the Ningtee, between Mannipore and the Birman empire. It attains to such a large size, that it affords planks upwards of three feet in breadth, and in appearance and grain much like mahogany. A similar tree is found in great plenty and perfection at Martaban. A poisonous vapour exhales from several of these varnishes, especially from that of Sylhet, and is apt to produce over the whole skin inflammations, swellings, itchiness, and pustules, as if the body had been stung by an infinite number of wasps; it is, however, never mortal, and the effect goes off in a few days.—*Edinburgh Journal of Science.*

Disease of Silk Worms and its Cure.—In the southern parts of France, where silk worms are raised, it is very common to observe the insects attacked by a disease called the jaundice, in consequence of the colour acquired by them. Very careful examination is continually made for the discovery of such worms as may be attacked by it, that they may be removed lest the disease, being contagious, should spread to the others.

The Abbé Esseric, of Carpentras, had recourse to a remedy, in these cases, which though apparently dangerous, had been warranted by the success of twenty years. He used to powder his worms over with quick lime by means of a silk sieve; he then gave them mulberry leaves moistened with a few drops of wine, and the insects instantly

set about devouring the leaves with an eagerness they did not usually show. Not one of the hurdles upon which he raised his worms appeared infected with the jaundice. It was at first supposed that the cocoons of silk were injured by this process; this, however, is not the case, and his method of practice is now adopted generally in the department of Vancluse.—*Quarterly Journal, Bull. Univ.*

Meteorological Prognostication observed in the Shetland Isles.—Mr. Scott, professor at the Sandhurst College, states that he has witnessed the following effect. It has been the custom to place drinking glasses in an inverted position upon a shelf in a cupboard on the ground floor of Belmont House. These glasses frequently produce spontaneous sounds similar to those which would be occasioned either by tapping them lightly with a pen knife, or by raising them a little, and letting them fall upon the shelf. These sounds always indicated wind, and whenever they occurred, the boats and vessels were immediately placed in security. No indication was given of the quarter from which the wind would come, but the strength of the sound was always proportionate to that of the tempest. The latter came sooner or later, but generally several hours after the sounds. No sensible motion being produced in the glasses, when the sound was strongest, Mr. Scott, considers that the phenomena may be electricity.—*Ann. de Chi. Quar Jour.*

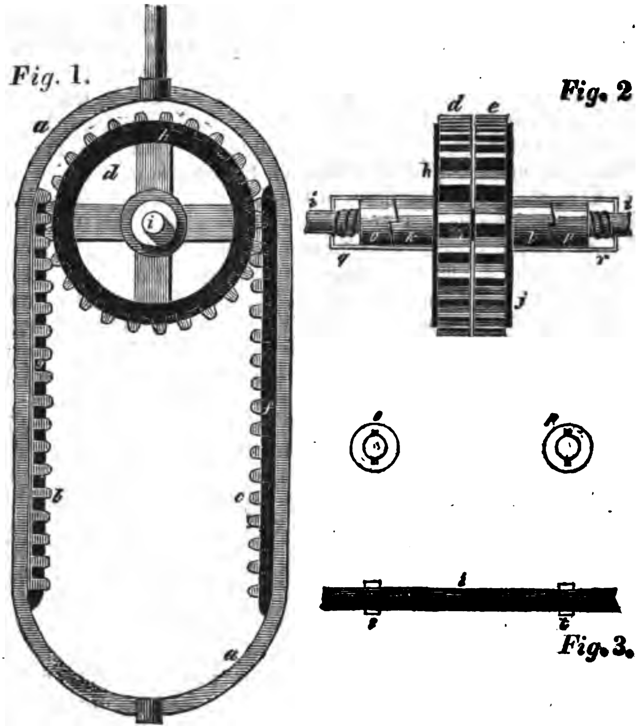
The Olive Tree.—There are on the southern borders of the Crimea, two varieties of the olive tree, which have become indigenous there. The one is pyramidical, and its fruit is perfectly oval: the branches of the other are pendant, and its fruit large, heart-shaped, and abundant. These valuable trees have resisted the injuries of centuries, and of successive nations of barbarians. In 1812, an imperial garden was formed at Nikita, (Russia,) into which the cultivation of these useful trees was introduced, by means of cuttings or slips, which no extremity of cold has hitherto affected; although some olive trees brought from France perished in the same garden in the winter of 1825-6.

Large Trees.—An ash-tree was lately felled in Blackburn Hollows, near Shire-Green, Yorkshire, containing 750 feet of solid timber; it was 10 ft. 6 in. across the stool. An oak-tree has also been recently felled in Shining-Cliff, near Crich, Derbyshire, containing 965 feet of solid timber, and 13 ft. 4 in. across the stool.

Large Ship.—The following is given in the *National Intelligencer*, on the dimensions of the United States ship-of-the-line, *Delaware*, Captain Downes, which are said to be those of the North Carolina:—

From the end of the jib and jib-boom to the ringtail boom 379 ft. Height from keel to the top of the poop deck 53 ft.; from keel to moon-sail mast head 253 ft.; breadth of beam from outside to outside, 55¼ feet; number of guns, 96 of heavy calibre. The force of this class of ship is but little more than half that of the Pennsylvania, now building at Philadelphia.

Correspondents will be replied to in our next.



NEW PATENT SUBSTITUTE FOR THE CRANK IN MACHINERY,

By J. Apsey, of John Street, Waterloo Road, Surrey.

The object of this invention is the obtaining of a rotary motion from an alternating one, that shall be free from the objections made to the crank, on account of the inequality of its power during a revolution; which inequality of power renders a heavy fly wheel necessary in all machinery where uniformity of action is required. There have been many contrivances proposed to effect this very purpose, which we shall make it our business hereafter to notice. The invention before us, for which a patent has just been enrolled, appears to possess some claims to attention, not from the originality of its principal arrangements,* but for some improvements upon the minor parts, which simplify its action.

* In the Repertory of Arts, vol. 39, in the specification of Mr. Aldersey's patent apparatus, enrolled 1821,—a reference to which will show that Mr. Apsey's combinations vary only in a very slight degree from Mr. Aldersey's.

Fig. 1 gives an elevation of the apparatus: *a a* is a strong elliptical frame of cast-iron, having fixed on each side a toothed rack *b c*. This frame is supposed to be immediately connected to the piston rod of a steam engine, or other rectilineal moving force, the motion of which causes the toothed wheels *d* and *e* (the wheel *e* is behind *d*, as shown by the edge view of them at fig. 2) to revolve on the axis *i*, which axis communicates its motion and force to whatever machinery may be connected to it. *f g* are two guide bars, and *h j* are two guide rings, or annular plates, in front of the wheels *d* and *e*, which serve to keep the respective parts in their proper places. It will be observed that the frame *a a* is represented as at the lowest point of its descent; during such descent it turns round the wheel *d* by means of the rack *g*, and at the same time causes a revolution of the axis; by the ascent of the frame the wheel *d* revolves the contrary way, but it then runs freely upon the axis, so as to have no influence upon it; during the same time the opposite wheel *e* becomes locked to the axis, and by means of the rack *f* causes the axis to continue revolving in the direction given it by the previous operation of the wheel *d*: as will be best understood by an explanation of fig 2, which exhibits the toothed wheels and axis distinct from the frame and side racks.

To each of the wheels *d* and *e* are fixed the guide rings *h j*, and a clutch box *k l*, which turn with the wheels on a smooth part of the axis, as shown at *i* in the separate fig. 3. These wheels are alternately connected to the axis, to give it motion by means of the clutches *o p*, which have merely a sliding motion upon the axis, and are constantly being pressed against the boxes *k l*, by means of helical springs *q r*, wound upon the axis, and confined in a case, as represented in the figure. The clutches *o p*. have grooves made in them, as shown by the end views of them, in the separate figures *o p*, through which the stubs *s t*, fig. 3, slide, and secure them to turn round with the axis.

As the action of this apparatus may not be quite clear to some readers by the foregoing, we will just repeat, that the raising of the elliptical frame containing the side racks, causes the wheel *e* to operate upon the axis by its becoming locked to it by the agency of the clutch *p*; but on the motion of the frame being reversed, by the reciprocating action of the piston rod (or other rectilinear moving force) the wheel *e* is released from the axis, and the other wheel *d* becomes locked to it by the agency of the clutch *o*, which carries the axis round in the direction previously given to it, and by the repetition of the alternations of the frame, the axis is caused to revolve continually in the same direction.

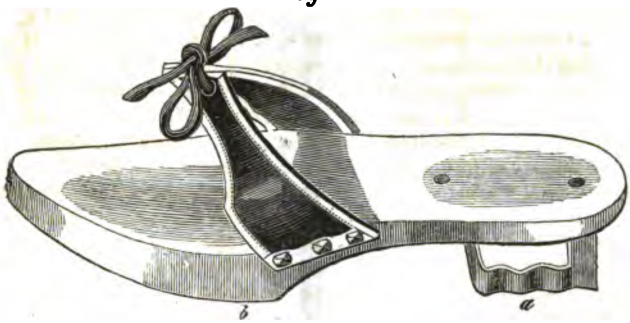
IMPROVED PATTEN CLOGS,

By Davis and Dickson, of 17, St. Martin's-le-grand.

The present is one among the many little mechanical improvements which are almost every day being added to the conveniences of life. Many women find it difficult to walk in pattens, especially those who are not in the habit of wearing them; clogs have for that

reason been more generally preferred of late years, but they are not so cleanly as pattens, as they splash or throw up a great deal of dirt upon the clothes. Now the contrivance before us partakes of both the clog and the patten; affording the security and firmness to the tread of the former, and the cleanliness of the latter; as will be evident on inspecting the accompanying engravings.

Fig. 1.



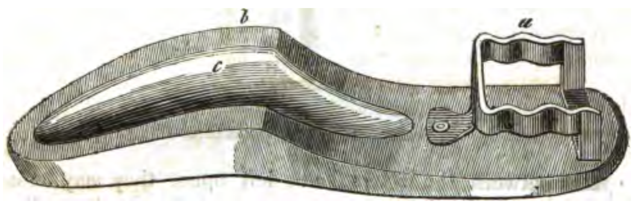


Fig. 2.

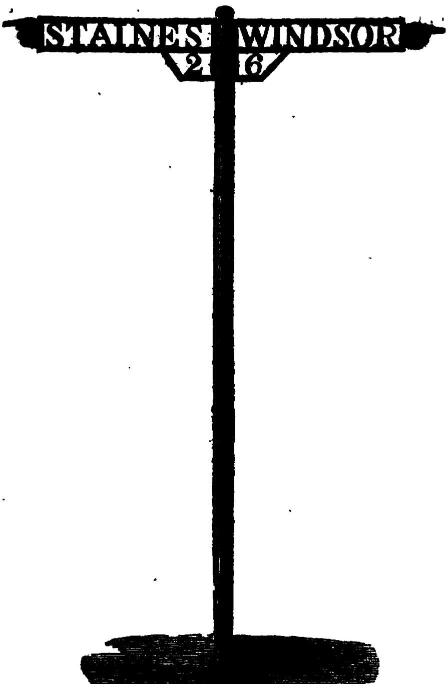
Fig. 1. shows the patten-clog in perspective, and Fig. 2 the same turned upside down: *a* is the patten-iron, of the peculiar form represented, which is found not to splash in the least; it is rivetted to the bottom of the clog as a support to the heel, and is upon a level with the projecting or thickest parts *b* of the sole, that supports the fore part of the foot. The clog is hollowed out at *c*, to render it lighter, and cause it to take up less dirt.

IMPROVED GUIDE POSTS.

TO THE EDITOR.

Sir,—Being an old traveller, and having often felt the inconvenience, difficulty, and even danger, from the want of efficient direction posts, especially in journeying by night, allow me to call your attention to an important improvement I have recently met with in various parts of the West of England, and to recommend, through the medium of your journal, their universal adoption.

The inscription, frame, and post, are altogether of cast-iron, and



the spaces between the letters being left open, they may be easily read at night, while they are equally serviceable by day. But the accompanying sketch of the new guide-post will explain its utility and construction better than can be done by words. They are prepared, I understand, in the following way.

A few alphabets and a set or two of numerals are prepared by the founder, who makes his mould in a proper frame, with such letters and figures as may be required, to form the names of the places and the distances in miles. The manufacture, it will be obvious, is one easily practised by any country founder; and I hope this notice in your widely-circulated journal will be the means of forwarding so desirable an improvement.

Judd Street,
27th May, 1828.

Your constant Reader,
GEOFFREY BURCHALL.

IMPROVEMENTS IN PRINTING.

The introduction of, as well as the great improvements made in this branch of art, being from their effects alike interesting to the philosopher and the mechanic, we have for some time past been desirous of inserting in the Register, a series of papers on the subject;

our labour has, however, been in some degree anticipated in the last number of the Quarterly Journal of Science, by Mr. Cowper, a gentleman who (having himself made several important improvements) is able to afford the most accurate information on the subject. Mr. Cowper's paper is, we regret to state, nevertheless limited to a very concise and popular view of the matter in question; he leaves wholly unnoticed several very admirable contrivances, and ascribes the improvements introduced under the patronage of the late amiable Earl Stanhope, as emanating exclusively from that nobleman. Notwithstanding these circumstances, Mr. Cowper's paper contains much valuable matter, and being accompanied by several diagrams calculated to explain in a very clear and obvious manner, the principles upon which several of the most-approved printing machines are constructed,—we purpose availing ourselves of a copy of it, as introductory to a series of essays, descriptive of the various ingenious machinery, and the process used in letter-press printing.

—"It is a remarkable fact, that from the invention of the art of printing to the year 1798, a period of nearly 350 years, no improvement had been introduced in this important art. In Mr. Dibdin's interesting account of Printing, in the Bibliographical Decameron, may be seen representations of the early printing presses, which exactly resemble the wooden presses of the present day. The immense superiority of the press over the pen, induced, perhaps, a general belief that nothing more was possible; or it might be that the powers of the press were quite equal to the demand for its productions.

"A new era has, however, arisen; the prompt and extensive circulation of the public journals and other periodicals requiring powers which the ordinary press could never reach.

"The first important improvement of the common press was the invention of the late Lord Stanhope. This press is composed entirely of iron;—the table on which the types rest, and the platten (or surface which gives the impression) are made perfectly level; he has thus introduced better materials and better workmanship, to which, however, he added a beautiful combination of levers, to give motion to the screw, causing the platten to descend with decreasing rapidity, and, consequently with increasing force, till it reaches the type, when a very great power is obtained. There have been, perhaps, twenty contrivances for obtaining the same effect; but as a *press*, Lord Stanhope's invention has not been surpassed: still it is only a press, and in point of *expedition* has little superiority of its wooden rival, producing 250 impressions per hour.

"Lord Stanhope was also the successful reviver of the art of stereotype founding, the process of which is as follows:—a brass frame is placed round the form of types; plaster of Paris mixed with water to the consistence of cream, is then poured on the type, the superfluous plaster being scraped off. When the plaster is hard, the mould is lifted off by means of the brass frame, and from which it is readily detached; it is now baked in an oven, and when well dried and quite hot, it is placed in an iron box or casting-pot, which has

also been heated in the oven; it is now plunged into a large pot of type-metal, and kept about ten minutes under the surface, in order that the weight of the metal may force it into all the finest parts of the letters; the whole is then cooled, the mould broken, and washed off, and the back of the plate turned in a lathe.

"This manufacture has been carried to a considerable extent; Mr. Clowes, the proprietor of one of the largest and best-conducted printing-offices in London, has on his premises between 700 and 800 tons of stereotype plates, belonging to various booksellers, the value of which may be estimated at £200,000.

"In connection with the Stanhope press may be briefly noticed a little improvement for the particular purpose of printing music, after a new process, and for which I have obtained a patent. In this new process the lines are formed of thin slips of copper driven into small blocks of wood, and the notes are formed of copper, driven into a separate block. Two note blocks, and two corresponding sets of lines, are placed on the table of the Stanhope press; to the ordinary tympan of the press is attached another tympan, which revolves in the direction of its plane on a pin in the ordinary tympan. Two sheets of paper are placed under two friskets, hinged to the revolving tympan; an impression being now taken, one sheet will receive the notes, and the other the lines. The revolving tympan is then turned half round, when the sheets will have changed places, another impression is taken, when both sheets will be perfected. This plan is now in operation at the printing-office of Mr. Clowes, to whom I have assigned the exclusive use of the patent.

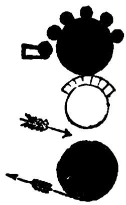
"It was in the year 1790 that Mr. William Nicholson took out a patent for certain improvements in printing, and on reading his specification every one must be struck with the extent of his ideas on the subject; to him belongs, beyond doubt, the honour of the first *suggestion* of printing by means of cylinders: the following are his own words, divested of legal redundancies:—

"'In the first place, I not only avail myself of the usual methods of making type, but I do likewise make and arrange them in a new way, viz. by rendering the tail of the letter gradually smaller, such letter (he erroneously says) may be imposed on a cylindrical surface; the disposition of types, plates, and blocks, upon a cylinder, are parts of my invention.

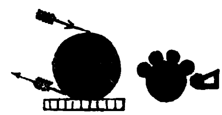
"'In the second place, I apply the ink upon the surface of the types, plates, &c. by causing the surface of a cylinder, smeared with the colouring matter, to roll over or successively apply itself to the surface of the types, &c.; or else I cause the types to apply themselves to the cylinder. It is absolutely necessary that the colouring matter be evenly distributed over this cylinder, and for this purpose I apply two, three, or more smaller cylinders, called distributing rollers, longitudinally against the colouring cylinders so that they may be turned by the motion of the latter; if this colouring matter be very thin, I apply an even blunt edge of metal or wood against the cylinder.

"'In the third place, I perform all my impressions by the action of a cylinder, or cylindrical surface, that is, I cause the paper to pass

between two cylinders, one of which has the form of types attached to it, and forming part of its surface, and the other is faced with cloth, and serves to press the paper so as to take off an impression of the colour previously applied; or otherwise, I cause the form of types, previously coloured, to pass in close and successive contact with the paper wrapped round a cylinder with woollen. He also described a method of raising the paper cylinder, to prevent the type from soiling the cloth.'"



Nicholson's, for arched Type.

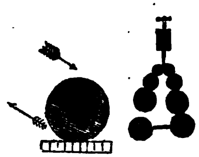


Nicholson's, for common Type.

"These words specify the principal parts of modern printing machines, and had Mr. Nicholson paid the same attention to any one part of his invention which he fruitlessly devoted to attempting to fix types on a cylinder, or had he known how to curve stereotype plates, he would, in all probability, have been the first *maker* of a printing machine, instead of merely suggesting the principles on which they might be constructed.

"The first *working* printing machine was the invention of Mr. Koenig, a native of Saxony. He submitted his plans to Mr. T. Bensley, the celebrated printer, and to Mr. R. Taylor, the scientific editor of the Philosophical Magazine. These gentlemen liberally encouraged his exertions; and in 1811 he took out a patent for improvements in the common press, which, however, produced no favourable result; he then turned his attention to the use of a cylinder in order to obtain the impression, and two machines were erected for printing the Times Newspaper,—the reader of which was told, on the the 28th of November, 1814, that he held in his hand a newspaper printed by machinery, and by the power of steam.

"In these machines the type was made to pass under the cylinder, on which was wrapped the sheet of paper, the paper being firmly held to the cylinder by means of tapes; the ink was placed in a cylindrical box, from which it was forced by a powerful screw depressing a tightly-fitted piston; thence it fell between two iron rollers; below these were placed a number of other rollers, two of which had, in addition to their rotatory motion, an end motion, that is, a motion in the direction of their length, the whole system of rollers terminated in two, which applied the ink to the types.

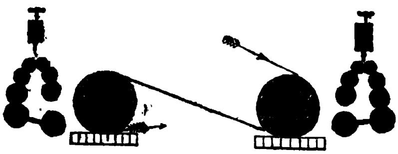


Koenig's single,
for one side of the sheet.

"In order to obtain a great number of impressions from the same form, a paper cylinder (i. e. a cylinder in which the paper is wrapped)

was placed on each side of the inking apparatus, the form passing under both. The machine produced 1100 impressions per hour; subsequent improvements raised them to 1800 per hour.

"The next step was the invention of a machine (also by Mr. Koenig) for printing both sides of the sheet. It resembled two single machines placed with their cylinders towards each other, at a distance of two or three feet,—the sheet was conveyed from one paper cylinder to the other by means of tapes,—the track of the sheet exactly resembled the letter S, if laid horizontally thus, ∽; in the course of this track



Koenig's double, for both sides of the sheet.

the sheet was turned over. At the first paper cylinder it received the impression from the first form, and at the second paper cylinder it received the impression from the second form;—the machine printed 750 sheets on both sides per hour. This machine was erected for Mr. T. Bensley, and was the only one Mr. Koenig made for printing on both sides the sheet—this was in 1815."

[*To be continued.*]

ON FURNACES WHICH CONSUME THEIR OWN SMOKE.

About fifty years ago, when, from the great improvements introduced by Watt and his contemporaries, steam-engines became very numerous, many scientific and practical men directed their attention to the discovery of some means by which the large quantities of dense black smoke issuing from the chimneys of the furnaces, so prejudicial to the health and comfort of persons residing in their neighbourhood, might be consumed. Many plans were proposed and tried; and, although they partially succeeded in burning the smoke, it was found that more fuel was consumed than by the previous arrangement in the furnaces. The increased expense incurred thereby led to the abandonment of most of the plans, except in those instances wherein the proprietors had been compelled to the adoption and continuation of burning smoke by indictments for public nuisances.

With the laudable object in view of reducing this great and growing evil, the Society of Arts, Commerce, &c., have for nearly fifty years past offered a reward for the best method of consuming smoke in steam-engines and other furnaces. The constant notification of this reward has probably tended to keep the subject alive in the minds of inventors; but it does not appear to have been productive of many plans, submitted to the Society, that could be

deemed of any great practical value. The small intrinsic value of the reward most likely induced inventors to prefer the taking out of patents, which promise, in successful contrivances, infinitely greater emoluments; and it is pretty well known that almost every patentee considers his invention as the *ne plus ultra* of perfection, and anticipates nothing less than a golden harvest as the result.

One of the most convenient and easily-practised contrivances presented to the Society, was by Mr. Chapman, of Newcastle-upon-Tyne, already described in our 39th number, first series; and we propose to ourselves noticing in our future numbers whatever plans may have been from time to time introduced, as we consider the evil to be of such a magnitude as to call for the exertion of journalists generally, but especially those in a scientific department.

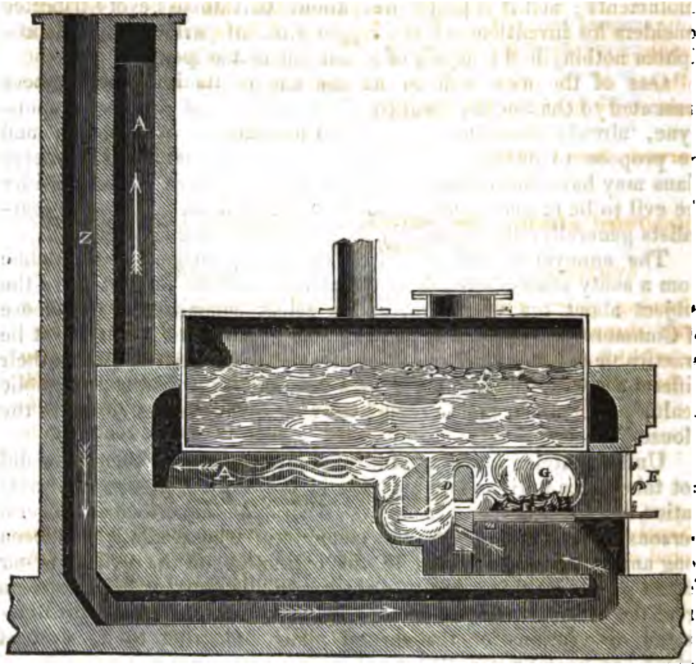
The annoyance and pernicious effects experienced by the public from a sooty atmosphere, drew the attention of the legislature to the subject about ten years ago, and a select committee of the House of Commons was appointed in 1819 "to inquire how far it might be practicable to compel persons using steam-engines and furnaces in their different works, to erect them in a manner less prejudicial to public health and comfort, and to report their observations thereupon to the House."

Unfortunately, however, the appointment of the committee did not take place until so late a period in the session, that the investigation did not proceed so far as was desirable; nevertheless, several persons were examined by the committee, whose minds had been long and practically directed to the extinction of the evil. In our future papers on this subject, we purpose giving some brief extracts from the evidence elicited before the committee, together with illustrated descriptions of the several plans submitted to it, most of which had been practically proved as advantageous.

Mr. Joseph Gregson, one of the witnesses examined before the committee, stated his opinion of the principal causes of the nuisance to be, the putting on the fire, or into the furnace, too much crude fuel at one time, and the chimneys being in general too low. He was acquainted with several modes that had been practised to remove the nuisance, which had been done effectually under steam engine boilers; but being generally attended with an *increased* consumption of fuel, it had seldom been adopted. In small boilers, where coke can be used instead of coal, the success had been more complete; but under large boilers, where a flaming fuel was required to operate on all sides, Mr. Gregson was not aware of any plans that effected the object better than those which he had invented.

The principle upon which these plans were founded, consist—first, in causing all the smoke, after it has arisen from the fire, to return into the heat of the fire before it enters into the flue or chimney, and so be consumed; second, in putting on no more fuel at any one time than the smoke of which can be consumed, and that without opening the furnace door for the purpose; third, in supplying every fire with a current of air, to counteract the effect of those winds that operate against the draft.

MR. GREGSON'S FURNACE FOR CONSUMING ITS OWN SMOKE.



The above engraving represents a vertical section of Mr. Gregson's furnace and boiler; the fire-place G, and the feeding door F. is made as usual; the smoke passes over the bridge D, and under the said bridge is an aperture through which a very intense heat passes, which enflames and consumes the smoke in the descending flue, by means of the supply of air through the aperture C; it then passes into the common flue or chimney A A, formed in the usual manner; Z Z is the air-shaft and drain to supply the fire with air, through a valve situated under the fire-place.

POISONS AND THEIR ANTIDOTES.

TO THE EDITOR.

Sir,—I think you would be extending a benefit to the community, by giving publicity to the enclosed table of poisons, the symptoms they produce, and the remedies which should be applied in such case. It happens not unfrequently that children swallow inadvertently many of the substances mentioned in the list; and I have known two or

three instances where the occurrence has been fatal, owing entirely to the ignorance of the parents and neighbours of the children, not knowing what steps to take, and the medical practitioner living at a great distance, having reached the patient too late to be of service. The extensive circulation of the Register of Arts will at once place the information in the hands of a vast number of persons, and the smallness of its price will be no obstacle to its introduction to almost every house in the kingdom.

I am, &c.

Norwich, June 1, 1828. WM. MOYLE.

Concentrated Acids; the vitriolic or sulphuric, nitric, muriatic, oxalic, &c.

SYMPTOMS.	REMEDIES.
Burning pain, vomiting, matter thrown up effervescing with chalk, salt of tartar, lime, or magnesia.	Calcined magnesia; one ounce to a pint of cold or warm water. A glassful to be taken every two minutes, so as to excite vomiting. Soap, or chalk and water; mucilaginous drinks afterwards; such as linseed tea, or gum Arabic and water.

Alkalies: potash, soda, ammonia, lime, &c.

Nearly the same: the ejected matter does not effervesce with alkalies, but with acids.	Vinegar or lemon-juice; a spoonful or two in a glass of water very frequently; simply warm water.

Mercurial Preparations: corrosive sublimate, &c.

Sense of constriction in the throat; matter vomited sometimes mixed with blood.	White of eggs; twelve or fifteen eggs beaten up, and mixed with a quart of cold water. A glassful every three minutes. Milk, gum water, linseed tea.

Arsenical Preparations: white arsenic, &c.

Extreme irritation; pain, sickness, and speedy death, if the poison be not soon counteracted.	Warm water, with sugar; in large quantities, to excite vomiting. Lime-water, soap and water, pearl-ash and water, mucilaginous drinks.

Preparations of Copper: brass, verdigris, halfpence, &c.

Symptoms nearly the same as from mercury.	White of eggs: mucilaginous drinks. See *mercurial preparations*, above.

Preparations of Antimony: emetic tartar, &c.

Extreme sickness, with other symptoms of poison, as above stated.	Warm water or sugar and water; afterwards a grain of opium, or fifteen drops of laudanum, every quarter of an hour, for two or three times.

Nitre, or Salt-petre.

SYMPTOMS.	REMEDIES.
Obstinate vomiting, sometimes of blood, &c.	The same as for arsenic, with the exception of lime water and alkalies.

Phosphorus.

Like mineral acids.	Like mineral acids.

Lead: sugar of lead, Goulard's extract, &c.

Great pain in the stomach, with consttiction of the throat, &c.	Large doses of Glauber's or Epsom salts, in warm water.

Barytes: the carbonate, muriate, &c.

Vomiting, convulsions, palsy, pain in the stomach, &c.	Half an ounce of Epsom or Glauber's salts, dissolved in a quart of water. Several glasses to be taken. In place of these salts large draughts of hard well-water.

Prussic Acid.

The most virulent of poisons, producing almost instant death when applied even in small quantities to the surface of the body.	Emetics: afterwards oil of turpentine, ammonia, brandy, with warmth, friction, and blisters.

Sal Ammoniac.

Excessive vomitings, convulsions, pain in the bowels, alteration of the features, death.	Vomiting, to be rendered easy by large draughts of warm sugar and water. If vomiting be not produced by the poison it must be excited by the finger. Afterwards opiates.

Glass, or Enamel.

If taken in coarse powder, produces irritation and inflammation of the bowels.	Large quantities of crumb of bread should be eaten. Afterwards an emetic of white vitriol, and demulcent drinks.

Alcohol: brandy, rum, gin, wine, &c.

Intoxication; when taken in large quantities insensibility, apoplexy, or paralysis; countenance swoln, and of a dark red colour; breathing difficult; often death.	A powerful emetic of white vitriol, or emetic tartar; vomiting to be encouraged by warm water, and large clysters of salt and water; bleeding; if the head be very hot, cold wet cloths may be applied. If the extremities be cold, friction.

Irritating Vegetable Poisons: Monk's hood, meadow saffron, ipecacuanha, hellebore, bear's foot, savine, &c.

SYMPTOMS.	REMEDIES.
Acid taste; excessive heat; violent vomitings; purging; great pain in the stomach and bowels. Externally applied, many of them produce inflammation, blisters, pustules.	If vomiting be produced by the poison, large draughts of warm water or thin gruel to render it easier. If insensibility be present, white vitriol; or other active emetic; after the operation of which, a brisk purgative. Then strong infusion of coffee, or vinegar diluted with water.

Narcotics: opium, henbane, hemlock, nightshade, &c.

Stupor, desire to vomit; heaviness in the head, dilated pupil of the eye, delirium, speedy death.	Four or five grains of emetic tartar, in a glass of water; if this does not succeed, four grains of blue vitriol, as an emetic. Do not give large quantities of water. *After* the poison has been ejected, give vinegar, lemon juice, or cream of tartar, and strong coffee.

Acrid Narcotics: mushrooms.

Nausea, heat, pain in the stomach and bowels; vomiting, purging, thirst, convulsions; cold sweats, death.	Three grains of emetic tartar in a glass of water; in fifteen minutes the dose to be repeated; after vomiting, frequent doses of Glauber's or Epsom salts, and stimulating clysters.

Nux vomica, St. Ignatius's bean, the upas, cocculus indicus, &c.

None of these inflame the part they touch. Introduced into the stomach, or applied to wounds, they are rapidly absorbed, producing generally rigidity, convulsions, and death.	The emetic as under mushroom; lungs to be inflated. Two ounces of water, one drachm of ether, two drachms of oil of turpentine, and half an ounce of sugar, mixed together; two spoonfuls of which to be taken every ten minutes.

Poisonous Fish: old wife, lobster, crab, dolphin, conger eel, muscle, &c.

In an hour or two, or sooner, after some fish have been eaten, more especially if stale, weight at the stomach, sickness, giddiness, thirst, &c. come on; in some cases death.	An emetic; vomiting to be excited by tickling the throat with the finger, and by draughts of warm water. After vomiting, an active purgative. Afterwards vinegar and water, or water sweetened with sugar, and an addition of ether. After the evacuations, laudanum.

Poisonous Serpents: the viper or adder, rattle-snake, &c.

SYMPTOMS.	REMEDIES.
A sharp pain in the wounded part, soon extending over the body; great swelling, first hard and pale, then reddish; faintings, vomiting, convulsions; inflammation, often extensive suppuration, gangrene, and death.	A moderately tight ligature to be applied above the bite, and the wound left to bleed, after being washed with warm water. The actual cautery, lunar caustic, or butter of antimony, to be applied. Then lint dipped in equal parts of olive oil, and spirit of hartshorn. Ligature to be removed if the inflammation be considerable. Warm diluting drinks, with small doses of ammonia or hartshorn, to cause perspiration. The patient should be well covered in bed, drinking occasionally warm wine. If gangrene threaten, wine and bark must be given freely.

Spanish Flies.

Nauseous odour of the breath, burning heat in the throat and stomach; vomiting, often bloody; bloody stools; heat in the bladder, convulsions, delirium, death.	Vomiting freely excited by sweet-oil, sugar and water, milk, or linseed tea; emollient clysters. Camphor dissolved in oil may be rubbed over the belly and thighs.

Venomous Insects: tarantula, scorpion, hornet, wasp, bee, gnat, &c.

In general only a slight degree of pain and swelling; sometimes sickness and fever.	Hartshorn and oil, salt and water; a few drops of hartshorn may be taken internally in a glass of water. The sting may, in general, be removed by making a strong pressure over it with the barrel of a small watch-key.

ESSAYS ON LITHOGRAPHY. NO. III.

(Continued from p. 142, Vol. II. N.S.)

Preserving Ink.

When a stone has been drawn on, all those parts which constitute the design, are covered with a thin coat of printing ink; but this ink being very siccative in its nature, dries after a certain time, and then takes with difficulty, or entirely refuses to receive the ink with which it must be charged for the purpose of obtaining a new impression. This inconvenience is but little felt in ink drawings; it being only necessary to cover these with a coat of gum, to preserve them for a great length of time. It is not so, however, with drawings executed in crayons, or with those which are engraved, or with stones

intended to produce coloured impressions. These are soon deteriorated, although defended by a coat of gum; they require to be protected by an ink which will always retain its unctuosity. The two following compounds have been found to succeed equally well.

Lithographic varnish, very thick,	2 parts.
Mutton suet, - - -	4
White wax, - - -	1
Oil of turpentine, - -	1
Lamp black, - - -	4

The three first articles are to be melted over a slow fire, when the oil of turpentine is poured in, mixing the whole well together; then is added the lamp black, a little at a time, stirring the mixture until it is formed into a homogeneous paste. The other composition consists of

White wax, - - -	1 part.
Suet, - - - - -	2

Oil of turpentine, Lamp black, } as much of each as is necessary to give a colour and consistency, similar to that of common printing ink.

These inks should be kept in a covered vessel, to preserve them from the dust and air. An inking stone and roller, must be appropriated exclusively to their use. The ink is spread over the stone with the roller; and after having taken an impression of the drawing it is well cleaned with a damp sponge; it is then charged with the roller, as it would be were another impression wanted; and the stone is then covered with gum water.

In Germany, these precautions are carried to a greater extent. When no more impressions are wanted, and the stone is to be put by for future use, the design is removed from the surface by spirits of turpentine, the stone is cleaned by washing it with water, then inked in the way just described, and then lightly coated with gum water. Before the stone is so disposed of, any spots, or blotches, which may be found upon the drawing, are carefully removed.

When the stone is wanted for new impressions, the gum is first removed, by water and a sponge; the preserving ink is cleaned off by a sponge and spirits of turpentine; the stone is then moistened, and charged with the ordinary printing ink, by means of the roller.

[*To be continued.*]

MISCELLANEOUS INTELLIGENCE.

A Crystal Bedstead.—Among the presents destined to the Schah of Persia by the Emperor of Russia, and which are customary in the East after the conclusion of peace, is a bedstead of extraordinary magnificence, and which has been exposed at the Emperor's Palace at Tauride in the capital, for public view, preparatory to its

being sent to Persia. It is entirely made of crystal, and is accessible by steps of the same material, all worked in imitation of large cut diamonds, incrusted in a solid frame. On each side there are spouts, intended to eject scented water, which by its murmurs invites sleep. It is crowned with a large chandelier, which spreads light in such a manner over itself and the rest of the frame, as to give to the whole the splendid appearance of millions of diamonds reflecting their brilliancy at once. This bedstead, which is perhaps the only one ever imagined or attempted, has been worked at the imperial manufactory of St. Petersburg.—*Foreign Papers.*

LIST OF NEW PATENTS.

WOOLLEN CLOTH.—To William Marshall, of Huddersfield, Yorkshire, for improved machinery for cutting, shearing, and finishing woollen cloth, &c. April 26. Two months for enrolment.

TUBES AND RODS.—To Thomas Breidenback, of Birmingham, for improvements in machinery for manufacturing tubes or rods. April 26. Four months.

EDGE TOOLS.—To James Griffen, of Witney Moor Works, near Dudley, for improvements in the manufacturing of scythe, chaff-knife, and hay-knife backs. April 26. Six months.

ANIMAL POISON.—To John James Watt, of Stepney, Surgeon, for a chemical discovery, by which animal poison may be destroyed, and the disease consequent thereon effectually prevented. April 29. Six months.

PROPELLING.—To Charles Carpenter Bombas, of the Inner Temple, Esq. for improvement in propelling locomotive carriages, machines, boats, &c. April 29. Six months.

MASTS.—To Thomas Milman, of Poplar, for improvements in the construction and fastening of made masts. May 1. Six months.

CANALS.—To Jonathan Brownill, of Sheffield, for an improved method of transferring vessels from one level to another, and also for the more convenient raising or lowering of weights, carriages, or goods, on land. May 1, Six months.

PAPER.—To James Palmer, of Globe-road, Mile End, Middlesex, for improvements in the moulds, machinery, or apparatus for making paper. May 6. Six months.

RUPTURE.—To Thomas Adams, manufacturer, for improvements on instruments, trusses, or apparatus for the relief, or cure of hernia, or rupture. May 6. Six months.

EDGE TOOLS.—To Francis Westley, of Leicester, cutler for an improved apparatus for the sharpening knives, or other cutting instruments. May 6. Two months.

SHIP BUILDING.—To Samuel Brooking, Esq. of Plymouth, for an invention of a turning, or shipping lid, for securing and releasing the upper masts of ships and vessels. May 6. Six months.

GERMAN CEMENT.—To Matthew Fullwood, jun. of Stratford, for an invention of cement, mastic, or composition, which he intends to denominate "German cement." May 6. Two months.

ROADS.—To John Benjamin Macneil, of Foleshill, engineer, for the preparation of materials for constructing and rendering durable roads, and for other purposes. May 6. Six months.

METAL STUD.—To Thomas Jackson, of Red Lion Street, for an invention of a new metal stud, applicable to boots, shoes, and other like articles of manufacture. May 13. Six months.

SPINNING.—To John Ford, of Vauxhall, Surry, for improved machinery for cleansing, opening, scribbling, combing, slubbing, and spinning wool, and for carding, roving, slivering, and spinning cotton, flax, hemp, silk, &c. &c. May 13. Six months.

PAPER MAKING.—To Thomas Bonsar Crompton, of Tamworth, and Enoch Taylor, of Marsden, for an improved process in paper making, which relates to the cutting. May 13. Two months.

LATCHES.—To Charles Chubb, of St. Paul's Church-yard, for improvements in the construction of latches, which may be fastened to doors or gates. May 17. Six months.

SUGAR.—To Thomas William and John Powell, of Bristol, for improvements in moulds for refining sugar. May 17. Two months.

TO OUR READERS AND CORRESPONDENTS.

The account of the proceedings of Scientific Institutions is unavoidably deferred till our next.

The discussions proposed by "PROBLEMATICUS" to be introduced into the Register of Arts, we would rather decline—matter so abstruse will be appreciated by comparatively very few readers.

Mr. Clare's favour has been received; a section of the machine, or some explanation of the arrangement of the valves is all we require to publish the description.

The Patent Planing and Groving Machine alluded to by A BUILDER we shall shortly insert a description of in the *Register*; the drawings are in hand.

Fig. 1.

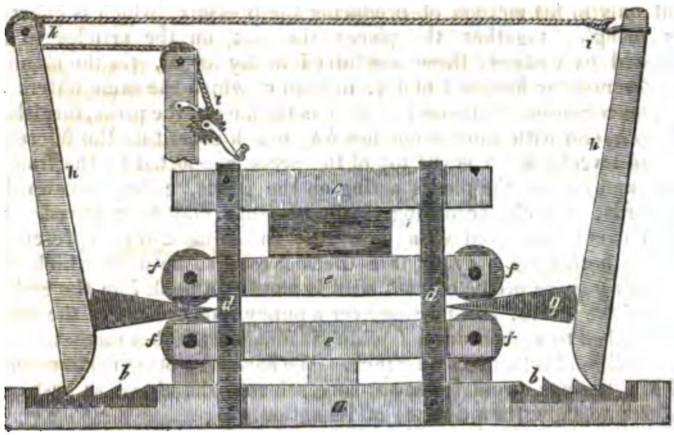
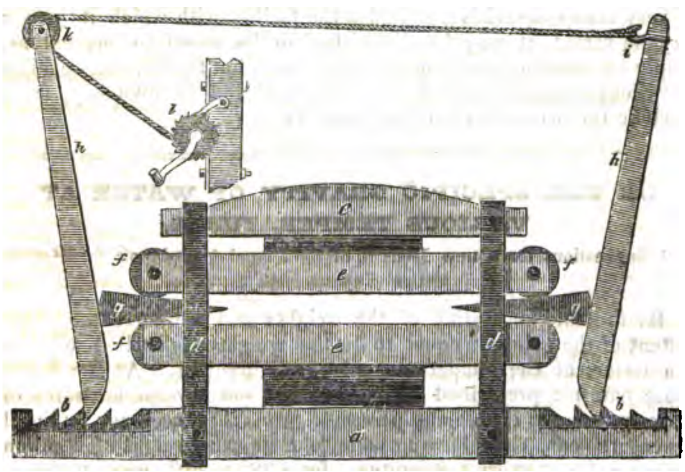


Fig. 2.



NEW LEVER & WEDGE PRESS,

Invented by MR. EWINGS, who obtained for it, as a Member of the London Mechanics' Institution,—*Dr. Fellowes's Prize of £*10. [see p. 172.]

THIS press, which is applicable to the packing of goods, pressing of juice from fruits, oil from seeds, or other purposes to which the screw press is usually applied, consists of a frame-work and two or more blocks or beams between which the articles to be subjected to

pressure are to be placed, and these vary in form, size, and material, according to the purposes for which they are intended. Mr. Ewings does not claim any novelty in the construction of these parts, but only in his method of producing the pressure, which is effected by bringing together the pieces that act on the articles to be pressed by wedges, these are forced in by levers, (in the manner represented by figures 1 and 2, in both of which the same letters of reference represent similar parts. *a* is the base of the press, furnished at each end with ratchet notches *b b*, which constitute the fulcrums of the levers *h h*. *c* is the top of the press, supported by the frames *d d*, and *e e* are the pieces acting on the goods, either downwards, upwards, or both, according as the pressure may be required. In fig. 1 it is represented acting upwards, and in fig. 2 it is represented acting both ways: *f f f f*, are friction rollers, between which the wedges *g g* are projected. A cord is fixed to a hook *i* on the end of one of the levers, and passing over a pulley *k* on the end of the other is attached to a small drum *l*, which is furnished with a ratchet wheel and pall, and is turned by a winch. We have seen other modifications of Mr. Ewings' press,* but we have selected the above as best calculated to show the principle of its action.

Amongst the advantages of this press have been noticed the simplicity and economy of its construction, as it may be made by almost any person accustomed to handle carpenters' or smiths' tools, of very cheap materials; and also the facility with which its power may be varied, it may be diminished or increased to any extent, simply by changing the form of the wedges: but the drawings exhibit its various applications and mode of operation so obviously, as to preclude the necessity of further remarks.

ON THE SPECIFIC GRAVITY OF WATER AT VARIOUS TEMPERATURES,

With Suggestions for a new Division of the Pound Avoirdupois for Hydrostatical Experiments.

By the late regulation of the weights and measures the cubic content of the gallon is equal to 10 lbs. weight of distilled, or pure rain water, at the temperature of 62° Fahrenheit. As the legislature has not prescribed dimensions for the several measures of capacity, so as to enable any person to prove their accuracy by lineal admeasurement, the following table, shewing the weight of a gallon of pure water at every temperature, from 32° to 80°, may, perhaps, prove useful, as, with the assistance of a good thermometer, and correct scales and weights, the justness of any measure can be ascertained with tolerable, though (from the defective sub-division of the avoirdupois pound) not perfect accuracy. The division of the pound

* One was exhibited at the London Mechanics' Institution, in which the pressure is produced between two vertical levers moving on joints at the bottom, and brought together at the top by wedges forced down by another lever.

avoirdupois into 16 ounces, making the ounce thereby equivalent to 437½ grains troy, is very inconvenient for hydrostatical experiments, as every division of the ounce, however contrived, will involve fractional parts of a grain. At present, the practical division of the pound is carried to only 256 parts (i. e. drams), or, at most, to 1024 parts (quarter drams), when it is practicable to extend it to 14,000 parts, or half grains, as will be presently shewn. The basis of our weights is the grain, from the multiple of which we have avoirdupois, troy, and apothecaries' weight. As it would probably occasion much inconvenience to the trading community were the subdivision of the pound to be altered in the transactions of buying and selling, I would merely suggest the adoption of a new sub-division for weighing of liquids, to be denominated "*liquid weights,*" in the following manner, viz.

14 ounces 1 pound avoirdupois,
10 drams 1 ounce,
10 decimes 1 dram,
5 grains 1 decime,

by a sub-division of this kind liquids might be weighed to half a grain, or $\frac{1}{14000}$th part of the pound, the advantage of which must be obvious. By the following table, it will be seen that a gallon of pure water, at a temperature of 71 degrees, weighs 9·99lbs., which, reduced, gives 9lb. 15oz. 13drs. 1qrs. $\frac{76}{100}$, hence, from the want of weights less than a quarter dram, the true weight cannot be obtained by nearly one-fifth of a dram; whereas, were the same weighed conformably to the above-suggested sub-division, the result would be 9lbs. 13oz. 8drs. 6dec., thus leaving no fraction, and proving that the weight of any fluid could be ascertained with sufficient exactness. If the term decime is objected to, any other more appropriate or significative might be substituted.

TABLE.

Deg.	Lbs.	Deg.	Lbs.	Deg.	Lbs.	Deg.	Lbs.
32	10·0101	45	10·0105	58	10·0035	71	9·9900
33	10·0104	46	10·0102	59	10·0027	72	9·9887
34	10·0107	47	10·0099	60	10·0019	73	9·9874
35	10·0109	48	10·0095	61	10·0010	74	9·9861
36	10·0111	49	10·0091	62	10·0000	75	9·9848
37	10.0112	50	10·0087	63	9·9989	76	9·9834
38	10·0113	51	10·0082	64	9·9979	77	9·9820
39	10·0113	52	10·0076	65	9·9968	78	9·9806
40	10·0113	53	10·0070	66	9·9957	79	9·9792
41	10·0112	54	10·0064	67	9·9946	80	9·9777
42	10·0111	55	10·0057	68	9·9935		
43	10·0109	56	10·0050	69	9·9924		
44	10·0107	57	10·0043	70	9·9912		

Stockwell, June 12, 1828. G. B. F.

SUSPENSION TRUSSED GIRDERS.

The trussing of girders and other large timbers on the suspension principle, is such an interesting and valuable improvement in the art of building, that we are much gratified in presenting to our readers some of the original designs of Mr. Renton for that purpose, contained in the annexed paper. Our readers will recollect that we recently described in our 30th number, new series, the excellent suspension truss of Mr. Conder; the publication of which occasioned Mr. Renton to write us the letter inserted in our 32nd number, from which it appears that the same idea had occurred and been put in practice by two individuals, unknown to each other, at the same time.*

Pimlico, May 31st, 1828

Mr. Editor,

Sir,—I beg to hand you a sketch and description of the various modifications I had proposed of the Suspension Truss, and to observe that I think your remark in the note appended to my former letter a very judicious one, and which no person of honourable intentions can object to comply with.

I am, Sir, your most obedient,

A. H. RENTON.

Description.—Fig. 1 is an elevation of the truss, having one of its flitchers removed to show the iron-work.

Fig. 2, a plan of the under side of the girder, showing the mode of uniting the suspension and tie links. [*This figure we have not had engraved, with the view of saving room; and as it may be easily conceived to represent the two flitches with the truss between, which is exhibited in the transverse section, fig. 4, explained below.*] *a a* the two suspension links connected with the two tie links *b b*, by bolts and keys through the cast-iron saddle pieces *d d*; the upper ends are united to the abutment pieces *c c*, by bolts passing through them; the beam is adjusted to its bearing, or cumbered if necessary, by the folding wedges (seen at *e e*, fig. 4) on the back of the saddle pieces, which it may be found necessary to steady sideways by blockings spiked to the beams.

Fig. 3 represents a different modification of the same principle, the several parts being similar to those of fig. 1. [*As the variation in fig. 3 consists merely in the suspension and tie links being made of about equal lengths, by placing the saddle pieces farther apart than those in fig. 1, we have omitted it in the engraving.*]

Fig. 4, a transverse section of the truss, showing one of the saddle pieces, the folding wedges, &c. to a larger scale. It is more advisable to use two flitches of timber with the truss between them, as this arrangement does not interfere with the other framing of the floor which takes a bearing on them.

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* Mr. Conder has presented the model of his suspension trussed girder to the London Mechanics' Institution, in the museum of which it may be seen.

Fig. 1.

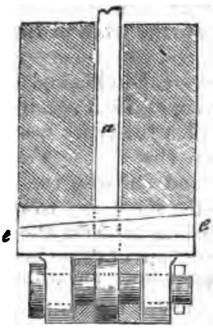


Fig. 4.

Fig. 5.

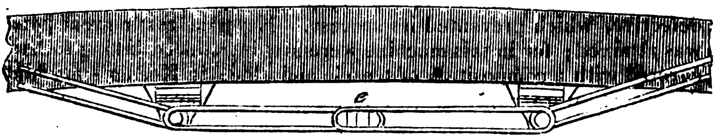


Fig. 6.

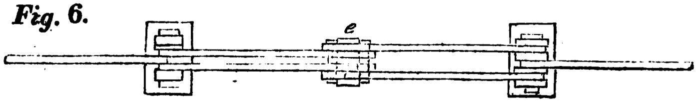
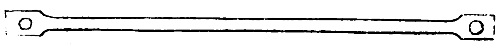


Fig. 7.



Figs. 5 and 6, elevation and plan of another mode of connecting the tie links, and adjusting them by wedges. This may also be done at the abutment pieces *c c*, by wedges in front of the bolts which should be flattened to receive them.

Fig. 7, another form of link which may be used, instead of the double bar link, although I prefer the latter.

The model which I have in my possession was constructed nearly as fig. 1; with suspension links as fig. 7; and the tie links connected by folding wedges, as fig. 5.

I have no doubt that it will be found applicable in many cases; and it will be highly gratifying to me should it be found worthy of general adoption.

IMPROVEMENTS IN PRINTING.

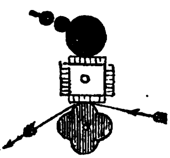
[Continued from p. 152.]

In the former part of this paper it was omitted to explain the nature of the diagrams, which although very obvious to the engineer it is proper to state that they merely exhibit the principle or mode

of action of the leading parts. In the foregoing, as well as in those that follow,—

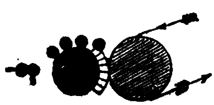
The black parts represent the inking apparatus.
The diagonal lines indicate the paper cylinders.
The perpendicular lines, the types or plates.
The arrows show the track of the sheet of paper.

"About this time Messrs. Donkin and Bacon were also contriving a printing machine; having in 1813 obtained a patent for a machine in which the types were placed upon a revolving prism, the ink was applied by a roller, which rose and fell with the irregularities of the prism, and the sheet was wrapped on another prism, so formed as to meet the irregularities of the type prism: one of these machines was erected for the University of Cambridge, and was a beautiful specimen of ingenuity and workmanship; it was, however, too complicated, and the inking was defective, which prevented its success. Nevertheless, a great point was attained; for in this machine were first introduced inking rollers, covered with a composition of treacle and glue; in Koenig's machine the rollers were covered with leather, which never answered the purpose well.



Donkin and Bacon's, for Type.

"In 1815 I obtained a patent for curving stereotype plates, for the purpose of fixing them on a cylinder. Several of these machines, capable of printing 1000 sheets per hour on both sides, are at work at the present day; and twelve machines on this principle were made for the Bank of England a short time previous to the issue of gold.



Cowper's single, for curved Stereotype.

Cowper's double, for both sides of the sheet.

"It is curious to observe that the same object seems to have occupied the attention of Nicholson, Donkin and Bacon, and myself, viz. the revolution of the form of types. Nicholson sought to do this by a new kind of type shaped like the stones of an arch. Donkin and Bacon sought to do this, by fixing types on a revolving prism, and at last it was completely effected by curving a stereotype plate.

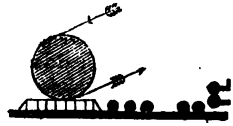
"In these machines two paper cylinders are placed side by side, and against each of them is placed a cylinder for holding the plates; each of these four cylinders is about two feet diameter: on the surface of the plate cylinder are placed four or five inking rollers, about three inches diameter; they are kept in their position by a frame at each end of the plate cylinder, the spindles of the rollers lying in the notches on the frame, thus allowing perfect freedom of motion, and requiring no adjustment.

"The frame which supports the inking rollers, called the waving-frame, is attached by hinges to the general frame of the machine;

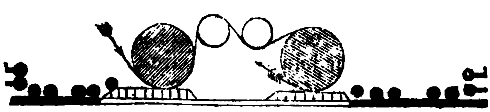
and the edge of the plate cylinder is indented, and rubs against the waving-frame, causing it to wave or vibrate to and fro, and consequently, to carry the inking rollers with it, thus giving them a motion in the direction of their length, called the end motion. These rollers distribute the ink upon three-fourths of the surface of the plate cylinder, the other quarter being occupied by the curved stereotype plates. The ink is held in a trough; it stands parallel to the plate cylinder, and is formed by a metal roller revolving against the edge of a plate of iron; in its revolution it becomes covered with a thin film of ink; this is conveyed to the plate cylinder, by an inking roller vibrating between both. On the plate cylinder the ink becomes distributed, as before described, and as the plates pass under the inking rollers, they become charged with colour; as the cylinder continues to revolve the plates come in contact with a sheet of paper in the first paper cylinder, whence it is carried, by means of tapes, to the second paper cylinder, where it receives an impression on its opposite side from the plates on the second plate cylinder, and thus the sheet is perfected.

"These machines are only applicable to stereotype plates; but they formed the foundation of the future success of our printing machinery, by showing the best method of furnishing, distributing, and applying the ink.

"In order to apply this method to a machine capable of printing from type, it was only necessary to do the same thing in an extended flat surface or table, which had been done on an extended cylindrical surface; accordingly, I constructed a machine for printing both sides of the sheet from type, securing, by patent, the inking apparatus, and the mode of conveying the sheet from one paper cylinder to the other by means of drums and tapes. A full description of this machine is given in Nicholson's 'Operative Mechanic,' and in the Supplement to the Encyclopœdia Britannica; in the latter, by some mistake, it is called 'Bensley's Machine.' A more brief account, and also a cut of the machine, appeared in the 'London Literary Gazette.' *We have a drawing of the same, which we purpose having engraved for insertion on the first opportunity.*



Applegath & Cowper's single.



Applegath and Cowper's double.

"My friend, Mr. A. Applegath, was a joint proprietor with me in these patents, and he also obtained patents for several improvements. I had given the end motion to the distributing rollers, by

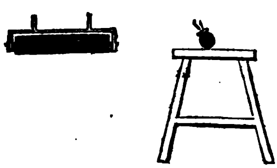
moving the same to and fro in which they were placed. Mr. Applegath suggested the placing of these rollers in a diagonal position across she table, thereby producing their end motion in a simpler manner. Another contrivance of Mr. Applegath's was to place half of my inking apparatus on one side of the printing cylinder, and half on the other side, in order that one half of the form might be inked on one side, and one half on the other, and so have a less distance to travel.

" Another contrivance of Mr. A. was a method of applying two feeders to the same printing cylinder; these latter inventions are more adapted to newspaper than to book printing.

" We have constructed upwards of sixty machines upon our combined patents, modified in twenty-five different ways, for the various purposes of printing books, bank-notes, newspapers, &c. They have, in fact, superseded Mr. Koenig's machines, in the office of Mr. Bensley, (who was the principal proprietor of Koenig's patent) and also in the office of the Times, as was announced in that journal a few days since.

" It may not be uninteresting to state that no less than forty wheels were removed from Mr. Koenig's machine when Mr. Bensley requested us to apply our improvements.

" Having on the first trial of our machines discovered the superiority of the inking roller and table, over the common balls, we immediately applied them to the common press, and with complete success; the invention, however, was immediately infringed throughout the kingdom, and copied in France, Germany, and America; and it would have been as fruitless to have attempted to stop the infringement of the patent, as it was found in the case of the kaleidoscope.



Cowper's Inking Table & Roller.

" This invention has raised the quality of printing generally;—in almost any old book will be perceived groups of words very dark, and other groups very light; these are technically called ' monks and friars,' which have been reformed altogether.

" The principal object in a newspaper machine is to obtain a great number of impressions from the *same* form, or one side of the sheet, and not from *two* forms, or both sides of the sheet, as in books.

" In the ' Times ' machine, which was planned by Mr. Applegath upon our joint inventions, the form passes under four printing cylinders, which are fed with sheets of paper by four lads, and, after the sheets are printed, they pass into the hands of four other lads; by this contrivance 4000 sheets per hour are printed on one side.

" Machines upon our joint patents are also used for printing the

Morning Chronicle,	Bell's Messenger,
St. James's Chronicle,	John Bull,
Morning Herald,	Standard,
Whitehall Evening Post,	Atlas,
Examiner,	Sphynx; &c. &c.
Sunday Times,	

"The comparative produce of the above machines is as follows:

Stanhope Press,............	250 impressions per hour.	
Koenig's Machine,..........	1800 *i. e.* 900 on both sides.	
Cowper's (Stereotype)......	2400 *i. e.* 1200	do.
Applegath & Cowper's (Book)	2000 *i. e.* 1000	do.
Do. (Newspaper) Chronicle,..	2000	
Herald,....	2400	
Times, ...	4000 = 66 per minute.	

"A variety of machines have been invented by other persons, which have not been attended with sufficient success to make me acquainted with their merits, with the exception of Mr. Napier, who has erected several machines for newspapers.

"Although the success of the inventions in which I have been engaged has rendered frequent reference to them unavoidable, I trust I have distinctly assigned to Mr. Koenig the honour of making the first working machine, and to Mr. W. Nicholson the honour of suggesting its principles; and that I have thus fairly stated the origin, the progress, and the success, of the recent improvements in the art of printing."

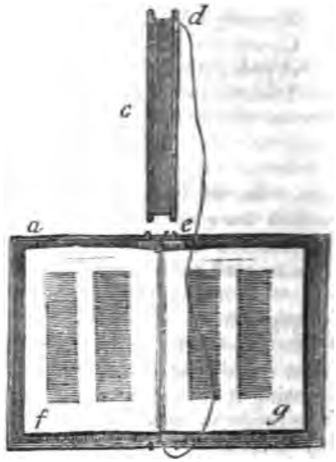
[*To be continued.*]

HAWKINS'S PATENT "INSTANT BINDER", OR PAMPHLET PRESERVER.

Manufactured by H. Flowers, 38, King Street, Borough.

A great many contrivances have been at various times proposed to effect the object of the present invention, but none of them appear to us to have been nearly so well calculated as Mr. Hawkins's for the purpose. The taking care of unbound magazines, pamphlets, and loose papers, is so very troublesome an office, that unless the portfolio or case to contain them, be provided with every possible convenience and facility for securing them *instantly*, in their proper places, it generally happens that they get destroyed, or become (from the want of order and classification), a perfect nuisance in a library, instead of being useful, instructive, and entertaining. In this manner, vast quantities of valuable periodical literature is constantly being lost, or rendered useless to the owners. Having possessed ourselves of several of these "Instant Binders" from our publisher, and finding their convenience so great, we take pleasure in recommending their use to others. Since we have adopted them, we have not had a tithe of the perplexity we had previously; now every little pamphlet or periodical in our possession, is as convenient to us for reference, as if bound in a book; in economy of *time* therefore, the advantage of the instant binder is most obvious.

The following description is that given with the patentee's handbill or prospectus, which, unlike the usual run of such documents, requires *no discount* whatever to be taken on the score of truth.



Description.—The instant binder consists of a portfolio *a*, having a double back *b*, containing as in a sheath, a flat needle *c*, as long as the back itself, with a sufficient quantity of thread wound around its length, to enable any person instantly to bind each sheet of a book in succession, so as to form a volume. This invention therefore, is eminently calculated to preserve and place in a convenient form of reference, correspondence by letter generally, and such tracts and pamphlets as are frequently dispersed in libraries without order or arrangement; also for the reception and instantaneous binding of music, newspapers, and the numerous daily and other periodical publications which issue from the press.

Directions for binding a sheet or a pamphlet into the preserver.—Take out the needle and thread from between the two backs, and lay the sheet *fg* against the back of the preserver; then take off from the needle a turn or two of thread, and lay it within the middle fold of the sheet, from the bottom to the top, after which, pass the needle down through the two backs, and draw the thread tightly, then turn the side of the sheet *g* over to the left hand, to fall on the part *f*, and make fast the thread by taking a turn or two with a loop or hitch around the horn *e* of the inner back, and the sheet will then be firmly bound; lastly, wind the loose or slack of the thread, around the horn of the needle at *d*, until the lower end of the needle is brought down close to the top of the preserver, and having made fast the thread, invert the end of the needle, and pass it into the hollow back, where it will remain suspended until it is wanted to bind another sheet, when proceed as above directed. To bind magazines or pamphlets, which usually consist of two or more sheets, or parts folded, so as to form several leaves, it will be best to unstitch the pamphlet, then taking one of the portions or parts, place it in the preserver, and pass the thread up the middle of the same, and proceed as if it were a single sheet, until all the portions composing the pamphlet are bound.

Copper-plate prints, half sheets of music, &c. may be bound by folding down about half an inch of the margin, and then proceed as in the case of a whole sheet.

SCIENTIFIC INSTITUTIONS.

Royal Institution.—On one of the recent Meetings at this Institution, Mr. Brockedon gave a brief, but highly interesting account of a new mode of projecting shot, discovered by Mr. Sievier. It appears that Mr. Sievier was amusing himself by firing off gunpowder in a syringe, in the side of which he had made a small touch-hole, near the bottom, and had arranged the charge of powder, until it was competent to throw the piston across the room, when the tube of the syringe was held fast. He then inverted the order of things, and held the piston whilst the tube was projected, when, instead of only going half-way across the room as he expected, it was forced *through the cieling into the room above*. This effect, which seemed to result from the continued re-action of the air against the inflamed powder in the tube, after it had left the piston from whence it was projected, induced Mr. Sievier to make hollow shot with a bamboo to contain the powder, which were fired off mandrils fitted on blocks of wood. The effects of these shot were very extraordinary, when the small charge of powder was taken into account. Mr. Brockedon considered the nature and principles of the recoil of guns, and stated, that he thought there were sufficiently evident reasons for the effect produced. One very great advantage of the method of throwing shot consists in the exceedingly light mandril and carriage which may be substituted for the heavy gun and its appurtenances, necessary to throw a shot of a given weight.

A Lecture *on the Ear*, has been also delivered by Mr. Curtis, Aurist to the King, in which the subject was treated of in a manner that gave great satisfaction to his audience.

Royal Society.—An interesting paper was read by S. Solly, Esq., on the changes which the strata forming the crust of the earth is continually undergoing through the agency of subterranean fires.

London Mechanics' Institution.—Wednesday, June 4th, a Quarterly General Meeting of the Members was held to receive the Committee's Report, on the state of the Institution, by which the various departments of the Establishment are represented in a very favourable light; the number of members continues about 1200; the importance of the various classes seems, from the number who avail themselves of them (about 360), to be fully appreciated by the Members. The past lectures we have already noticed as they were delivered, and the future were reported to be on *Peake's Steam Engine*, and *Hague's Crane*, by Dr. Birkbeck, on the 13th June, which Lecture we shall notice in our next number; on the *Functions of the Human Body*, by Dr. Birkbeck, to commence on the 27th June; on *Chemistry*, by Mr. Hemming, to succeed Mr. P. Christie's Course on *Architecture*, or Dr. Birkbeck's on *Physiology*.

After the usual business of a Quarterly Meeting, the following Reports on the adjudicators on the Models and Essays put in competition for Dr. Fellowes's Second Annual Prizes; and also on the

Perspective Drawing of last year's Prize Machine, put in competition for the Silver Medal offered by the Vice-Presidents to be competed for by Members of the Drawing Classes.

Report on the Models.

It was within the range of reasonable expectation, and certainly by those who participate in the enlightened views of the liberal-minded founder of these prizes, it was most anxiously hoped that the second year of competition would have found the field for mechanical ingenuity and practical skill more widely occupied than on the preceding occasion. Perhaps some pardonable impatience in those who had laboured with zeal at the seed time, may have spurred on their imaginations to a somewhat premature reckoning on the harvest; however that may be, it is certain that the immediate growth is not so luxuriant as was anticipated. It seems that the pen is more facile of command than the chisel and the file; but it ought not for a moment to be lost sight of by the members of the London Mechanics' Institution, who compete for Dr. Fellowes's prizes, that they are playing the nobler game who strive to invest theory in practical usefulness. It is a far higher effort to involve principles in new combinations, and draw them into profitable operation, than merely to talk fluently, rationally, and even learnedly on the abstract truths of science. The practical mechanist, who effects an useful object, is the benefactor of his kind. The speculatist may win the applause of the initiated few; but, in soaring beyond the interests, if not the understanding of the many, he fails to win their praise, if he do not even escape their observation.

Amongst the mechanical inventions submitted this year to their decision, the adjudicators have selected, as of first merit, the model marked ♉, which is that of a press of considerable power, and applicable to several purposes of importance in manufactures and husbandry, and to this they award the prize. This press is simple in construction, possesses effective, sufficient, and variable power, and in its operation presents ingenuity and novelty in the application and combination of the mechanical elements which enter into its composition. The usefulness of this apparatus is enhanced by the facility and economy with which it may be constructed.

The attention of the adjudicators has been fixed with much satisfaction on another of the models sent in for competition, which exhibits a pretty, and, indeed, valuable modification of the common steam-engine governor. In this improvement, however, there is less range of the inventive faculty than in the first-mentioned apparatus.*

(Signed by) George Birkbeck,
Charles Toplis,
John Millington.

London Mechanics' Institution,
Dec. 1827.

Report on the Mechanical Drawings.

The judges have been highly gratified by the display of talent in the department of mechanical drawings amongst the competitors for the Vice-President's Medal for the best drawing of the prize machine of last year. Their gratification has been the higher, in finding this talent to have sprung and flourished within the schools of the London Mechanics' Institution. To the correct, well-coloured, and carefully-finished drawing in perspective, of Mr. Lyne's comb-cutting engine, marked ⊙, they decree the prize; and, from the other specimens now before them, they feel a confidence in the anticipation, that a few more months will produce from the same schools rivals, which the present successful candidate must look upon with jealousy and respect.

(Signed by) George Birkbeck,
Charles Toplis,
John Millington.

London Mechanics' Institution,
Dec. 1827.

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* Will be described in our next.

Report on the Essays.

The adjudicators of the prizes given by Dr. Fellowes to members of the London Mechanics' Institution, have to report to the Committee of Management that they have read attentively and with pleasure the several essays submitted this year to their judgment. In decisions of this nature, it is matter of gratulation when the judges have to hesitate on the comparative merits of the productions subjected to their award; it is indicative of a more extended display of talent, and it is peculiarly gratifying to witness the expansion of that kind of talent, which it is the especial object of our Institution to develope and to foster. such has been the grateful occupation of the judges on the present occasion. They have had to remark the growth of a more perfect knowledge of the subject than that which the productions of the last year manifested; and they have also had to measure, with somewhat more of hesitation, respective merits approximating in degree though varying in kind. The task of the adjudicators, under circumstances like these, is not unmingled with some degree of pain. They cannot but feel sensible of a want of power to mete out compensation by the measure of merit; where but one reward is to be adjudged, all excellence, which falls short of the highest, fails of its recompense.

In the award of last year the judges were guided in their decision by the knowledge of principles and conversancy, with mathematical reasoning exhibited in the essay to which the prize was decreed; it was a matter of question with them whether that essay was the production of a practical mechanic. The event justified their decision, in shewing the production to have emanated from the talent of an individual of the operative classes, and one whose abilities had been roused and cherished within our own walls; yet had study brought him acquainted with the theory of his subject more than occupation had led him to practical conversancy with it.

On the present occasion an essay, similar in its mode of treating the subject to that of the last successful one, and perhaps on a level with it in merit, stands prominent in the productions of this year, yet, like its predecessor, it wants the stamp of the mechanic's hand. The mallet and the chisel have not left their trace so decidedly as have the compasses and scale. The essay which boldly and ably competes with this one in the career of talent seems to have been meditated at the bench, and modelled into form when the finished day's task relaxed the hand from toil, and gave it up the willing instrument of active and improving mind.

The essay marked ⨀, has been written with an ample knowledge of the elementary principles of the action of the lever, and with correct and extended views of the practical bearings of those principles. The writer has examined the machine in its several forms, and has considered with judgment its several applications. So fully, indeed, has he investigated the properties of this important element of mechanism, that he may be said to have nearly exhausted the subject. Viewing the character of this essay in the various lights in which it presents itself to them, the judges concur in the decision of awarding to the writer of it the prize for the present year. In giving this decision, the adjudicators cannot but repeat their regret that they have it not in their power to mark by more substantial testimony than simple approbation their sense of the deserts of other competitors.

Amongst the essays are some which indicate talent still immature; but which, under the culture of industry in this genial climate of liberal encouragement, will one day ripen into fruit of excellence and profit.

London Mechanics' Institution, (Signed by) George Birkbeck,
Southampton Buildings, John Millington,
Dec. 1827. Charles Toplis.

The President then introduced to the Members, Mr. George Ewings, Carpenter, as the inventor and maker of the Press to which the Prize of *Ten Pounds* be awarded; and explained to the meeting

the nature of the Press;* and Mr. Thomas Kingsworth, Hinge-maker, as the Author of the Essay, on the Lever which had obtained for him the other prize of *Ten Pounds*; and also Mr. John Braund, who had executed the best Perspective Drawing of last year's Prize Machine, and thereby obtained the *Vice-President's Medal.*

Society for the Encouragement of Arts, Manufactures, &c.—The Rewards adjudged by this Society during their Session just terminated, were presented to the respective candidates at the Opera House, by the Earl of Radnor, V. P. who presided in the absence of H. R. H. the Duke of Sussex, who was prevented from attending from indisposition.

The following were amongst the most important awards of the Society:—

IN AGRICULTURE.

To Lord Newborough, for planting above 3,700,000 forest trees on his estates in Caernarvonshire and Denbighshire,—the large Gold Medal.

To Joseph Houlton, Esq. Grove Place, Lisson Grove, for introducing the roots of stachys palustris as an esculent vegetable,—the Silver Ceres Medal.

IN CHEMISTRY.

To Mr. George Jackson, 30, Church Street, Spital-fields, for his apparatus for instantaneous light,—the Silver Isis Medal.

To Mr. T. Cogan, 399, Rotherhithe Wall, for his method of purifying linseed and rape oils,—the Silver Isis Medal and £10.

IN MECHANICS.

To Mr. L. Hebert, 19, Queen Street, Chelsea, for his prepared plumbago to be used instead of oil for chronometers,—the Gold Isis Medal.

To Mr. W. Melvine, 22, Ironmonger Lane, Cheapside, for his detached escapement for chronometers,—the large Silver Medal.

To Mr. T. Judge, New End, Hampstead, for his self-adjusting pendulum,—the large Silver Medal, and £5.

To Mr. R. May, New Road, Deptford, for his watch escapement,—the large Silver Medal and £5.

To C. H. Ackerley, Lieutenant R. N. Plymouth, for his safety rods for ships' boats,—the large Silver Medal.

To J. Higgins, Esq. 370, Oxford Street, for his revolving lights for steam boats,—the large Silver Medal.

To H. W. Hood, Esq. Commr. R. N. for his floating bridge to communicate between a ship and the shore,—the large Silver Medal.

To Mr. J. Castell, 44, Dartmouth Street, for his improved cock for bottling wine,—the large Silver Medal.

To Mr. T. Chapman, 4, Royal Row, Lambeth, for his carriage for Mr. Palmer's railway,—the Silver Isis Medal and £5.

To Mr. Al. Bain, 7, Broad Court, Long Acre, for his moveable stamps for bookbinders,—the Silver Isis Medal and £5.

To Mr. W. Hilton, 10, Regent Street, Pall Mall, for his ladder crane,—the large Silver Medal.

To Mr. James Dowie, and Mr. Al. Black, Edinburgh, for their improved machine for the use of boot and shoe makers,—two Silver Isis Medals.

To Mr. R. Mottershead, for his expanding piston for high-pressure steam engines,—the large Silver Medal and £20.

To Mr. T. E. Bonner, 38, Tabernacle Walk, Finsbury, for his door lock,—the Silver Isis Medal.

To Mr. Jos. Clement, 21, Prospect Place, Southwark, for his improved turning-lathe,—the Gold Isis Medal.

* Described in our present Number, page 161.

To Mr. And. Smith, 2, Palace Street, Pimlico, for his lever-cramp,—the Silver Isis Medal.

To J. P. Holmes, Esq. 21, Old Fish Street, Doctors' Commons, for his obstetrical instruments,—the large Gold Medal.

To Mr. C. Gibsen, 71, Bishopsgate-within, for his spoon for administering medicine,—the Silver Isis Medal.

IN MANUFACTURES.

To C. T. Tower, Esq. Weald Hall, Essex, for his flock of Cashmeer goats, and for a shawl manufactured from their wool,—the large Gold Medal.

To Mr. R. Lloyd, 71, Strand, for his sheet cork,—the Silver Isis Medal.

IN COLONIES AND TRADE.

To the Rev. L. Guilding, King's Town, St. Vincent's, for his communication respecting the insects which infest the sugar cane,—the Gold Ceres Medal.

To W. Green, Esq. Quebec, for pigments, the produce of Canada,—the Gold Isis Medal.

To Greg. Blaxland, Esq. Sydney, New South Wales, for wine, the produce of his vineyard in New South Wales,—the Gold Ceres Medal.

In addition to the above, about 78 Rewards were given in the department of the Fine Arts, for Copies, Original Drawing, Painting, Engraving, &c.

WESTERN LITERARY AND SCIENTIFIC INSTITUTION.—On Monday the 2nd. instant, a warm discussion took place relative to a proposed slight increase in the small salary of the Secretary, who has performed many extraneous duties, and has given a series of Lectures on *Botany*. The Musical Meeting was deemed irrelevant to the purposes of a scientific institution, &c.

MISCELLANEOUS INTELLIGENCE.

WATER SPOUT ON THE LAKE OF GENEVA.—At 52 minutes past six, on the 11th of August last, a portion of a dark cloud, suspended below the summit of the Savoy Mountains, suddenly took a vertical direction, and being gilded with the deep orange tint of the setting sun, attracted universal attention, and enabled the spectators to trace all its movements. Its form was that of an inverted cone, the summit of which was about 200 feet from the surface of the lake, to which it precipitated itself in less than two minutes. This elongation of the cone took place by an oscillatory motion. This part of the spout appeared cylindrical, and its diameter was about ten or twelve feet. The moment it reached the lake a great mass of the water was briskly agitated, as if it had been boiling, the foam rising to a height of more than 50 feet. This large column of water was inflected like a riband exposed to the wind. In eight minutes it reached the mouth of the Rhone, and as long as it was above the river, the boiling continued, and the column was unbroken. When it quitted the river the boiling ceased, and the whole soon disappeared; the base of the cone continued longest visible. — *New Monthly Mag.*

Temperature of the Earth.—M. L. Cordier, in his essay read to the French Academy of Sciences, deduces from his own observation and those of others, that the heat increases as we penetrate from the surface towards the centre of the earth, at the rate of about one degree Fahrenheit in 45 feet; that the heat of boiling water is found in our latitudes about a mile and a half below the surface; that at the depth of 60 miles, the heat must be so intense as to keep such rocks as we see at the surface in a state of fusion; that the interior of the globe, in short, consists of a molten mass, encompassed by a solid crust or shell, about 60 miles in thickness.

Petrifaction.—Some beautiful petrifactions of mushrooms were lately discovered by some workmen in excavating limestone from the quarries at Cawsand, near Plymouth. The specimens were in the highest state of preservation, even to the red brown colour which distinguishes the genuine mushroom on the under surface. The largest was about twelve inches in circumference, and the smallest about six inches. The stalactites which incrusted these interesting relics of a former world are nearly transparent, and were taken out of the strata with scarcely any injury.

Disputed Migration of Mackerel.—Some of the French naturalists believe that the mackerel, herring, &c. never leave their native seas, but at the approach of winter lie among the mud at the bottom of the deep water till the ensuing spring.

A carved Inkstand,—made of Shakespeare's mulberry tree, has been presented by Mrs. Hannah More, to the Bristol Institution.

The Largest Ship ever constructed,—is said to be now building in the United States of America. She is to carry not less than 180 guns, most of them 90-pounders, and will be competent to cope with a fleet of ordinary ships.

The Blind Traveller.—Letters have been received at Plymouth from Lieutenant Holman, the blind traveller. At their date he was at Fernando Po, in good health, and on excellent terms with the chiefs. He was to commence immediately his journey to the interior of Africa.

Aerial Equestrianism.—Mr. Green ascended into the clouds at Boston, on horseback! His charger was a well-trained pony, suspended from the balloon in place of a car.

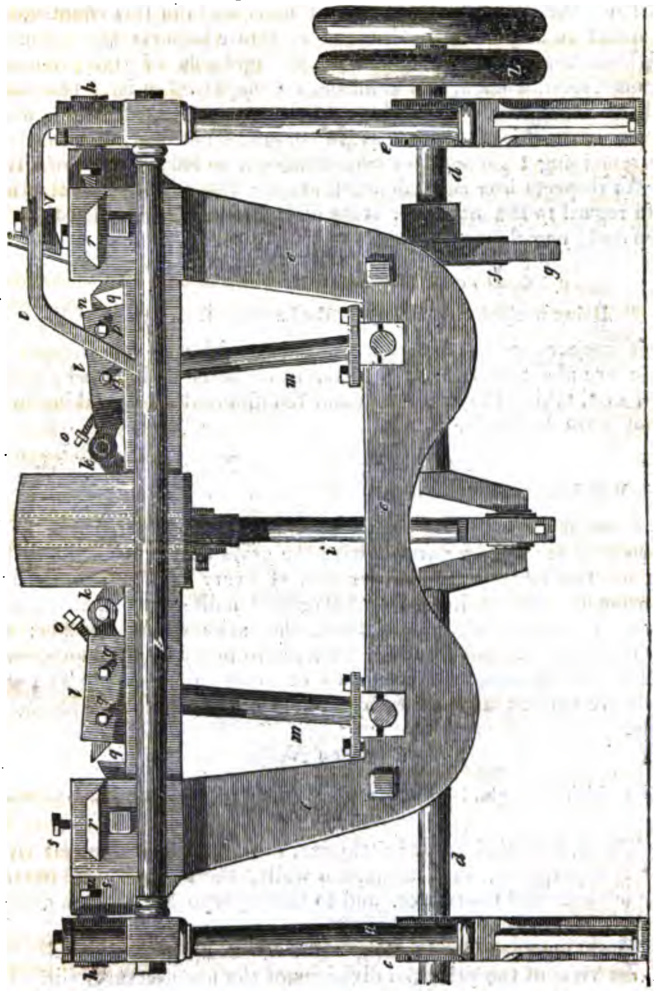
TO OUR READERS AND CORRESPONDENTS.

We shall be happy to know something of the internal construction of the Machine introduced to our notice by Mr. C——e, otherwise we cannot explain its operation.

R. S——n had better have a steel axletree and pinion cut out of the solid.

There is not sufficient novelty or ingenuity in the Spinning Machinery alluded to by "A Weaver," to induce us to spare the room for its description, or incur the expense of so many illustrative engravings. If he will be at the pains of *condensing* them we shall have no objection.

Fig. 1.



PATENT NAIL MAKING MACHINE,

By Messrs. Ledsam & Jones, of Birmingham.

[*With a preliminary Account of the Nail Manufacture generally—by the Editor.*]

Previous to describing the above-mentioned curious and useful machine, a patent for which has just been enrolled, we shall give a slight sketch of the nail manufacture generally, in order that the reader may understand to what particular department the present

improvement is applicable, and form a just estimate of its utility or advantages.

From the immense quantities of nails made in this country, the manufacture may be deemed one of first-rate importance: for in the neighbourhood of Birmingham alone, upwards of sixty thousand persons, men, women, and children, are employed in it. The materials of which nails are made, are, as near as we can judge, about 94 per cent. of iron, 3 per cent. of copper, 2 per cent. of brass, and the remaining 1 per cent. of various alloys, including a few of silver.

As respects *iron* nails alone, there are three leading distinctions with regard to the nature or state of the metal from which they are prepared, namely:—

Wrought, or hammered-iron Nails,

Being worked out entirely by the hammer from bars or rods.

These are the best for general purposes with very few exceptions; there are about 300 different sorts, as respects their *figure*; and of each sort, taking the average, about ten different *sizes*, making in all about 3000 distinctive names.

Cut, or pressed-iron Nails,

Which are *cut* out of strips of rolled sheet iron by direct pressure.

Some few sorts of these are preferable to hammered-iron nails, when they are driven parallel with the grain of the wood; but they are for the most part, and for almost every application but that mentioned, greatly inferior to hammered nails; nevertheless, from their being made with less labour, they are rendered cheaper, and are therefore extensively used. There are many large manufactories of them in Birmingham, and two or three in London. The sorts made are various and extensive, but more limited than hammered nails.

Cast-iron Nails,

In which the metal is melted, and *cast* into moulds of the precise form of the nails made.

These, from their great brittleness, are applicable to comparatively but few purposes, such as garden walls, the lathing of plasterers, coarse shoes and boots, &c. and to those purposes only, on account of their great cheapness.

The foregoing classification, although comprising a popular and correct view of the principal divisions of the manufacture, will admit of various subdivisions, as regards the nature of the materials, which necessarily influences the properties of the nails; it will therefore be proper just to observe:—

That *hammered-iron nails*, according to the several purposes for which they are designed, are made of one of three distinct qualities of iron, that is to say, the staple material is more or less refined. For instances,—the very best iron is used to make horse-shoe nails, and wheel-wrights' nails; the second-best iron, for the smallest or finest kinds of nails, and a few of the larger, for work requiring

great stability; and the commonest or cheapest iron, for making the ordinary sorts of nails.

That *cut or pressed-iron nails* vary in quality according to the goodness of the sheet iron employed, and according to the degree of excellence of the machinery; but to explain these points clearly would require a greater space than can properly be devoted in this paper.

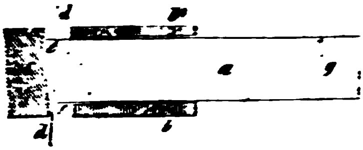
Also, that *cast-iron nails* are made of three distinct qualities, which are produced by annealing processes subsequent to that of casting. In the state they come from the moulds, they are frequently nearly as brittle as glass; by the common process of annealing, that brittleness is lessened, and by another and more lengthened process of annealing, cast-iron nails are rendered almost as soft and ductile as copper.

In the various attempts to produce cast-iron nails, that should be equally stiff, and not more liable to break than wrought-iron hammered nails, it has uniformly been found, that the requisite degree of stiffness is only obtained in the unannealed state, in which a blow struck upon the head of a nail in the slightest degree deviating from the perpendicular is certain to break it; and when they are sufficiently annealed to prevent their breaking, they are so soft and yielding, as to bend against the slightest obstruction. These difficulties have hitherto proved insurmountable; the result has been a very limited use of cast-iron nails.

In the making of *cut or pressed-nails*, the manufacturers have had similar difficulties to contend with, but the quality of the wrought-iron sheets from which they are made approximating more to that of hammered iron, they are not so deficient in the requisite ductility and hardness as those of cast-iron, consequently, they are much more extensively used: it is in this branch of the manufacture, that the patent machine just invented by Messrs. Ledsam and Jones is applicable, and in order to show that it is an improvement upon the ordinary process, we shall briefly notice how that is conducted.

Sheets of rolled iron of the thickness of the intended nails are cut into strips, that are in width equal to the length of the intended nails; being then held horizontally, with a flat side upwards, the ends are pushed in a slide against a regulated stop, under a cutter, fixed to a powerful lever, or (as is generally the case) to the lower extremity of a fly-press, which cuts off a portion, constituting a brad or nail. In making brads or sprigs, which have no heads, and are merely wedge-formed pins, the strip of iron is turned upside down at every cut, which keeps the inclination of the angle of the cut uniform throughout the length of the strip of iron, without any waste. In making brads with half heads or bills, the cutter is made to give a half turn backwards and forwards, and the iron is kept with the same side upwards; thus are formed two *billed* brads out of one parallelogram. To make this matter quite plain we here add a diagram.

a represents a strip of sheet iron, which is passed between two guides *b b*, against a stop *c*; *d* is the edge of the cutter, which may be supposed to have descended and cut off the portion *e*, forming a



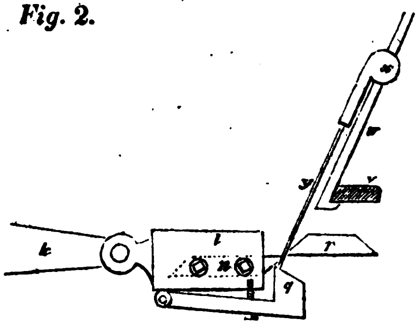
brad; it will now be seen that if the strip *a* be turned upside down, and pushed against the stop, the portion *f* will take the place and the position of *e*, and consequently be cut off by the next descent of the cutter *d d*; and thus, by repeatedly turning the strip over and back again, and pushing it forward every time, with one hand, while the other is occupied in working the lever of a fly-press, the brads are formed with great rapidity. It will be seen likewise in reference to those lines in the figure marked *g*, that they represent two brads with half heads or "*bills*," which being placed in that manner, head to point, it is obvious, that by turning the cutter half way round alternately, they will be cut both alike out of one parallelogram, as represented.

Except for making the larger kinds of cut nails, the strength of boys, girls, and women, is fully competent, who are consequently employed in most manufactories, each of them working a distinct press; and nails are *thus* made by one person with almost as much rapidity as they can be counted. Ingenuity has, however, devised *much more expeditious* modes of manufacturing these articles, of which the machine we have now to describe is a most respectable specimen.

Messrs. Ledsam and Jones have given in their specification a series of drawings, representing two forms of this machine, together with several variations in the details, but it has been our study to comprise the subject in one elevation, which we trust will be comprehended by the following explanation.—

a a exhibits two (out of four) of the standards to the frame, the other two being behind the others, and connected in a similar manner by horizontal bars, as that at *b*. This frame is fixed, and forms the support of a swinging frame *c c*, and a horizontal shaft *d d*, which revolves in bearings at *e e*; *f* is an eccentric on the shaft *d*, regulated by a screw, and acting on a frame *g*, attached to the swinging frame *c*, which latter vibrates upon arms or trunnions *h h*; *i* is a connecting rod, attached to the crank on the axis *d*, and to the axis of a stout pair of leaves *k k*; this axis moves vertically in a groove, as shown by dotted lines in the central cheeks of the swinging frame; the leaves *k k* are connected by hinges to the boxes *l l*, which are supported by the rocking standards *m m*; these boxes contain the *moving* cutters *n n*, which are kept in their places by screws *o o* and *p p*, and others underneath (not shown): *q q* is a guage attached to the under side of the boxes *l l*, and regulated by screws (not shown); on the inclined faces of this guage, the rods or strips, of which the nails or brads are formed rest; *r r* are fixed cutters in the end cheeks of the swinging frame, and retained in their places by screws *s s*; *t* a frame attached to the fixed frame, and carrying the cross bar *v*, shown on

Fig. 2.



a larger scale by fig. 2; *w* is one of the guide rods, hooked on to the cross bar *v*, and screwed up to a beam above; *x* a perforated weight sliding upon *w*, having its lower end hollowed to receive the ends of the bar or strip *y* of which the brads are made. This bar slides down after every cut against the edge of the fixed cutter *r*, and rests upon the surface of the guage *g*, which determines the breadth of the nail; then the leaf *k* forces forward the box *l*, containing the cutter *s*, which cuts off the iron in a right line with the plane of the under surface of the opposite cutter *r*. *z*, fig. 1, is a band wheel for communicating motion from the prime mover, with a loose pulley at its side for throwing the machine out of action.

The action of the machine is as follows:—By the revolution of the axis *d*, the eccentric upon it forces the swinging frame *c* into an *inclined* position; the crank on the axis at the same time acting upon the rod *i*, draws the leaves *k k* into a horizontal position, and thereby forces the moveable cutters *s s* forward against the fixed cutters *r r*, dividing obliquely the strips of iron placed between them in their progress, the same as if cut by shears; the brads thus formed, fall down the inclined surface of the guage, and are received in a box beneath. The opposite vibration of the swinging frame makes a second cut, and thus on both sides of the machine, (though represented only on one side) a series of rods or strips of iron are placed in a line, all of which are cut twice at every revolution; thus, supposing 8 rods or strips (the number used by the patentees) are applied to each pair of cutters, 32 brads are cut at every revolution of the axis. Of course a considerable power being necessary to do this, that of a steam engine or water wheel is to be employed in this machine in preference to manual labour. The ends of the cutters are only brought into view in the figure, these are, however, of greater, and may be of any required length, to cut a given number of brads at a time, as may suit the power of the engine and other circumstances.

It will now be seen, that by the patentees employing long continuous cutters, and causing them to take an opposite inclined position at each vibration of the swinging frame, a number of brads are cut at once, without moving the rods, which drop down to the stop on

the guage as they are cut. By the former mode described, with the fly presses, the cutter moves always in the same plane, and the iron is turned round or inclined instead.

In cutting that species of brads with heads, the patentees employ cutters with gaps left in their edges, and the cross bar *v* has slits in it to receive the rods *y*, and instead of being fixed, receives an alternating side motion from the frame *c c*.

PATENT IMPROVEMENTS IN MOORING SHIPS

And other floating Bodies, and in the Apparatus for their Construction, by Messrs. De la Fons and Littlewart, of St. Mary Axe, London.

The invention expressed in the above title is one of great ingenuity, and seems calculated to become one of considerable public utility. The object of the patentees is the driving of peculiarly-constructed piles into the earth under water, with their heads completely sunk under ground, to which chains and floating buoys are to be attached for the purpose of mooring ships, so that their draught shall be nearly horizontal, or perpendicular to the position of the piles, by which the utmost resistance is obtained.

The piles proposed to be used are of timber, and of a square form; they are bored throughout their length in the centre, through which is passed a strong bar of iron, the lower end of which is fastened to the pointed iron shoe of the pile: the upper end of the bar passes through the head of the pile, above which it is formed into a loop for the convenience of attaching a chain to it. The upper end of the pile is strongly hooped as usual; and its sides have a series of notches operating as barbs to prevent the pile from being drawn up again. Near to the lower extremity are fixed by hinges two or more flaps, which, being turned upwards against the sides of the pile, present no obstruction as it enters the earth, but have a tendency to spring open to a given angle if the pile is drawn upwards, thus producing very powerful obstacles to its ascent.

The piles thus prepared are placed perpendicularly in the water, and driven into the earth by means of the following apparatus :—A large heavy piece of cast iron, forming a hollow frustrum of a cone, with spikes round the edges of its base is provided; at the upper or smaller end of this there is formed a large ball and socket joint of cast iron; this ball is hollow, and of such diameter, as to admit of a square tube passing through it of sufficient diameter to form an external case or guide for the pile on being driven, which is thus effected.

Two barges are moored along side each other, and at a convenient distance apart, and connected together by a strong platform, over and between each; on this platform are erected two pairs of shears, fastened together at top so as to form the outlines of a quadrangular pyramid. On the platform is also fixed a strong windlass or crane. By means of the crane and various pullies and ropes the pile inclosed in the case and apparatus described is let down to

its place; the cone readily fixes itself, having no tendency to shift by reason of the spikes entering the ground. The chain attached to the upper end of the pile is now passed through the iron ram or weight, the follower, with the hooks for drawing up the ram, and a hollow cone, which detaches the hooks from the ram. The chain being now drawn up tightly, the pile assumes a vertical position, however uneven the surface of the ground on which the cone rests, which is effected by means of the ball and socket joint admitting of a free motion to the pile in its square case, and the chain serves as a guide to the ram in its descent upon the head of the pile. The lower end of the ram is hollowed out in the centre to admit of the loop at the top of the pile. The hooks attached to the follower take into a deep groove at the upper end of the ram, which is thereby drawn up. On reaching its utmost elevation, the upper ends or levers of the jointed hooks enter a small cone, which, pressing them together, draws the hooks out of the groove in the ram, and allows it to fall upon the head of the pile; when, by a succession of blows, the head of the pile is driven nearly even with the top of the metal case, a square piece of timber, two or three feet long, with a hole longitudinally throughout its centre, and strongly bound with iron, is passed over the chain so as to rest at the top of the pile. This piece is now employed as a *punch* to drive the pile down the square tube, and, when that is done, a second, a third, or more similar pieces are added in succession, until the pile is driven below the surface of the ground, which, being ascertained by any convenient simple means, the iron cone, tube, &c., are drawn up, and the next pile driven by a similar operation to that described. When the required range of piles is sunk, they are connected to buoys by vertical chains, and the buoys are connected to one another by horizontal chains (in various ways according to circumstances), and the vessels are proposed to be moored within the figure described by the range of sunken piles, that the pull may be given laterally instead of vertically.

In this manner the patentees propose to construct the foundations for piers, the surrounding of dangerous rocks, shoals, &c., by attaching horizontal chains to the vertical chains of the buoys; also, to supporting floating lights, and to various similar purposes to which it may obviously be applied.

PATENT METHOD OF MAKING BLACK PEPPER INTO WHITE.

By J. A. Futton, Lawrence Pountney Lane, London.

The specification of this singular patent has just been enrolled; we have given it a perusal, and find the process to be exactly what we had anticipated, and very similar to that which it is said has been used by the trade for the same purpose for many years past. The inelegant and apparently uncleanly appearance of black pepper, has occasioned almost its total disuse at table, and every artifice has been

in operation to make a spurious white pepper. The P. D. or pepper dust of the shops, it is well known, is nothing but the sweepings of the warehouses sifted, this having lost its pungency and flavour, and being thoroughly incorporated with all manner of dirt, is necessarily "*mixed off*" with fresh ground pepper to give it a taste. Sometimes the sweepings are made up with oil cake, and by sifting and rolling made into little balls resembling grains of pepper, which are sold to housekeepers who chuse to grind their own pepper, that they may be *sure to have it genuine.* These and other amusing tricks are daily practised upon the unsuspecting haters of black pepper on account of its dirty appearance, who, however, swallow the warehouse dust with infinite *gout* and satisfaction.

Mr. Futton's patent process may be thus briefly described. The common black pepper is steeped in water for a day or two, then laid in heaps, and occasionally turned; fermentation ensues, and in a space of time, varying from a week to a month, the outer, or black skin bursts, and falls off. The pepper is then bleached by oxymuriate of lime, sulphur, or other well known means. This done, it is washed, and lastly, dried in the air, or in an oven. Black pepper thus metamorphosed, so exactly resembles the genuine white pepper, as even to deceive the most experienced of judges, the brokers.

ON THE EFFECTS OF MANURE UPON YOUNG PLANTATIONS OF FOREST TREES,

By W. Withers, Jun., Esq., of Holt, in Norfolk.

That the growth of young plantation trees is favoured by keeping the ground free from weeds is generally acknowledged; but from the want of fair comparative experiments the amount of advantage is not known with any degree of precision, and is probably, by most gentlemen, underrated. Hence, carelessness and mistaken economy are too often allowed to interfere so as to prevent, either from the beginning, or after the first year, the performance of this very advantageous practice. In like manner, the benefit of marling poor shallow sandy soils, either previous to, or soon after planting, has been known and experienced in a few insulated cases. These instances, however, of success, do not appear to have attracted much notice, the particulars not having been published, and the formers of such plantations not having instituted any comparative experiment to shew the precise benefit derived from the adoption of this practice. Much credit, therefore, is due to Mr. Withers, who, for the last sixteen years, has been going on with a course of judicious experiments directed to the two points above mentioned. This gentleman appears to have demonstrated, that when a plantation is made on poor light land, and the trees are neglected during the first four or five years, not only a large proportion of them will die, but those which survive will be so checked in their growth, that no subsequent care will restore them to a state of vigour. He, therefore, attaches great importance to the *early* treatment of young trees, which should be

encouraged to establish themselves speedily in their new situation, and to acquire, as rapidly as possible, habits of luxuriant growth. For this purpose, besides paring, and burning, and trenching the soil previous to making the plantation, he spreads on it marl and farm-yard manure, as for a common agricultural crop, and at the same time keeps the surface perfectly free from weeds by hoeing, till the young trees have completely covered the ground. The progress which they make under this treatment is so extremely rapid, as apparently to justify, in an economical point of view, the extraordinary expenses which attend it. In three years, even oak and other slow-growing forest trees have covered the land, making shoots of three feet in a season, and throwing out roots, well qualified by their number and length to derive from the sub-soil abundant nourishment in proportion as the surface becomes exhausted. The large Silver Medal of the Society of Arts was awarded to Mr. Withers for the foregoing experiments.—*Trans. Soc. of Arts, XLV.*

METHOD OF PREPARING OIL-COLOUR CAKES,

Invented by Mr. George Blackman.

Take of the clearest gum mastich, reduced to fine powder, four ounces; of spirits of turpentine, one pint; mix them together in a bottle, stirring them frequently till the mastich is dissolved: if it is wanted in haste, some heat may be applied, but the solution is best when made cold. Let the colours to be made use of be the best that can be procured, taking care that, by washing, &c., they are brought to the greatest degree of fineness possible. When the colours are dry, grind them on a hard close stone, (porphyry is the best,) in spirits of turpentine, adding a small quantity of the mastich varnish. Let the colours so ground become again dry; then prepare the composition for forming them into cakes, in the following manner:—Procure some of the purest and whitest spermaceti you can obtain; melt it over a gentle fire, in a clean earthen vessel; when fluid, add to it one-third of its weight of pure poppy-oil, and stir the whole well together; these things being in readiness, place the stone on which your colours were ground, on a frame or support, and, by means of a charcoal fire under it, make the stone warm; next grind your colour fine with a mullar; then, adding a sufficient quantity of the mixture of poppy-oil and spermaceti, work the whole together, with a mullar, to a proper consistence; take then a piece, of a fit size for the cake you intend to make, roll it into a ball, put it into a mould, press it, and it will be complete.

When these cakes are to be used, they must be rubbed down in poppy or other oil, or in a mixture of spirits of turpentine and oil, as may best suit the convenience or intention of the artist.

N. B. It may be proper to observe, that Mr. Blackman's colours in bladders, are prepared with a mixture of spermaceti, and differ from his cakes only in having a larger proportion of oil.—*Franklin Journal.*

METHOD OF MAKING TABLETS

Similar to the German Asses-skin, from which Writings, or Drawings made with a Pen and Ink, or a Pencil, may readily be rubbed off, when desired.

Take either vellum, parchment, very fine cloth, or paper, and stretch it in a frame as tight as possible. Then take twelve pounds of white-lead, and pound it very fine; add thereto one-third part of the best plaster of Paris, and one-fourth part of the best stone-lime; pound them well, mix them well together, and grind them very fine with water. Then take a new glazed vessel, and dissolve six or seven pounds of the best double size over a fire, and mix the above ingredients in this till it is of such a consistence as to lay on with a brush. Then lay three or four layers on the skin or cloth as smooth as possible, observing that the skin is dry each time before a second layer is put on. Then take the best nut or linseed-oil, and to every pound of this oil add four ounces of the best white varnish, and mix them well together. Then put on three or four layers of this oil thus prepared, each time exposing it to the air till it is thoroughly dry: this is for the white sort. For a brown or yellow, add to every pound of the above three or four ounces of the best stone ochre, or orpiment, or Dutch pink, and three or four ounces of litharge. These must be well ground with very old linseed-oil, and laid on, as smooth as possible, ten or twelve times, exposing it each time to the air, to be thoroughly dry, before a second layer is put on: observe you do not put it where any dust or dirt can fall upon it. It may be, by the same process, altered to any colour: as for instance, to a red, by tincturing it with vermilion, or the like; to a blue, by Prussian blue; and for a black, by pounding slate, grinding it very fine, and mixing with it as much ivory black as will turn it to a fine black colour. When it is thoroughly dry, you may write on it with a slate-pencil, or black or red lead.—*Ibid.*

OBSERVATIONS ON A CEMENT USED IN SPAIN,

FOR THE PRESERVATION OF SHIPS' BOTTOMS.

Charleston, S. C. March 10, 1828.

Sir,—Although a distant subscriber, I have taken much interest in the success of your very valuable Journal, so well calculated to convey useful information among practical men like myself. The observations by Mr. Gill, 'on various cements,' have brought to my recollection a circumstance which occurred some years ago under my own observation; and I have thought that the publication of it might be of very material benefit to the marine department, and shipping interest of our country.

I am a practical shipwright, and have been constantly engaged in building and repairing vessels for twenty-eight years; in the year 1804, a large Spanish ship, which required considerable repair,

arrived in this port, and was committed to my charge. On taking the old sheathing from the bottom, I found a coat of plaster, or chinam, which adhered so firmly, that it required considerable exertion to dub it off with the adze. It not only adhered to, but appeared to have become incorporated with the main bottom; its hardness was about equal to that of soft marble, or plaster of Paris, in its natural state. This cement had been on the ship's bottom for many years; and the captain, an elderly man, who was a native of Biscay, in Spain, requested that a similar covering should be again supplied; on my expressing my ignorance of the nature of the preparation, he offered, with the assistance of the cook, to make the mixture for me, and desired that I would have two plasterers ready, with their trowels, to apply it, when the ship was in a state of readiness to receive it.

The composition he made as follows:—The best barrelled stone-lime was taken, and slaked, by pouring on it just enough fresh water to produce that effect, and to cause it to fall into a dry white powder: this, when cooled, was sifted through a fine wire sieve into a trough like a bread-trough; there was then added to it a portion of common fish oil, sufficient to bring it to the consistence of soft putty, so as to work with ease under the trowel. No water whatever was used, excepting that for slaking the lime in the first instance.

On the second day of sheathing the plasterers had put on the width of two or three streaks, all fore and aft, more than we could cover, and this portion I concluded would wash off in the night after we had righted the ship. The captain laughed at my fears, and said he would vouch for the cement being there in the morning, and to my no small surprise I found this to be the case. It had acquired a tinge of yellow, and was much harder than when put on, although it had been covered with the salt water during the whole night. The captain assured me that it would soon attain the hardness of that which had been removed.

The ship was one of about 450 tons, and, as nearly as I can recollect, the quantity of material used was about five casks of the unslaked stone-lime, and I think three sixty-gallon casks of oil. I am not certain on this point, although I cannot err greatly: the consistence which the mixture must have will be a sufficient guide for the proportions. In the process of making, and applying it, the information which I have given is perfectly correct. After it is prepared for use, it is kept in covered vessels to preserve it from the rain, or other moisture. The ship's bottom is prepared for sheathing in the usual way, by being paid with a coat of good half stuff, and allowed to cool, before the plaster is put on, as this accelerates its adhesion to the main bottom.

Although it is out of my province, and I am therefore unable to form a judgment on this point, I have thought it worth inquiry whether this cheap cement might not be substituted for the costly Roman, or Dutch water cements. It would be worth the trial, whether it would not harden in fresh, as well as in salt water, and

answer the purpose of building piers, locks, and other struct ur under water.

If you think these remarks likely to be useful, please to insert them, and oblige,

Your's, &c. JAMES MARSH.

[*Ibid.*

CHEAP CHEMISTRY. LETTER III.*

TO THE EDITOR.

Sir,—The other impurities in water described in your report of Mr. Hemming's lecture, No. 26, p. 27, which were detected by tests, are carbonates, muriates, and sulphates of lime, magnesia, and soda, with carbonic acid, and sulphuretted hydrogen. The carbonic acid of the carbonates, or the carbonic acid held in solution, is readily detected by lime, or barytic water, either of which occasions a milky appearance in the water. Lime water is prepared by pouring distilled water on pure lime, and filtering the solution, when the precipitate has subsided. Barytic water is prepared in the same way, by *boiling hot* water. The muriatic acid of the muriates, or in the free state, is immediately precipitated by a few drops of a solution of nitrate of silver. The silver having a greater affinity for muriatic acid than for the nitric, combines with it, forming a flaky insoluble compound, muriate of silver. The nitrate of silver is made by adding to pure silver twice its weight of nitric acid, diluted with an equal bulk of water. It is sold by chemists under the name of lunar caustic. The sulphuric acid of the sulphates, or sulphuric acid combined with water, is detected in minute quantites by the solution of muriate of barytes. Barytes having a powerful affinity for sulphuric acid, abstracts it from most combinations, forming the insoluble compound, sulphate of barytes. The muriate of barytes is prepared by dissolving carbonate of barytes in dilute muriatic acid. The solution must be filtered till transparent, although the acids combined with salifiable bases are thus readily detected, the neutral salts they form can only be discovered accurately by a slow evaporation. The sulphuretted hydrogen in water is rendered evident by a few drops of a solution of acetate of lead, which occasions a black precipitate. This is formed by dissolving acetate of lead (the sugar of lead) in distilled water, and filtering the solution.

To detect alum in bread.—Pour boiling distilled water on slices of the bread; when cold, filter the solution through blotting paper till transparent, add a few drops of the solution of muriate of barytes, which precipitates the sulphuric acid of the alum, rendering the fluid milky and turbid. To discover copper in pickles.—Slice them, and add equal parts of liquid ammonia and distilled water: if copper is present a blue colour will result. To shew lead in wine, &c.—

* The first of these valuable letters is inserted in No. 26, the second in No. 29, N. S.

Filter it several times through newly prepared animal charcoal, (from bones or hoofs) coarsely powdered, till colourless. Add a few drops of liquid sulphuretted hydrogen, which will turn the liquor black if lead is present, or a few drops of a solution of sulphate of soda, (Glauber's salts) which will occasion a flaky white precipitate.

To detect arsenic.—Add a solution of nitrate of silver, with a few drops of liquid ammonia, or solution of potash, a greenish yellow precipitate is formed; a similar effect takes place if nitrate of copper is employed. Liquid sulphuretted hydrogen imparts a bright yellow colour to a liquor containing arsenic, and a stick of nitrate of silver held in contact with a glass rod dipped in liquid ammonia, either immediately *over*, or between the surface of a fluid impregnated with arsenic occasions a flaky light green precipitate to fall.

Corrosive sublimate (oxymuriate of mercury) is precipitated of a dense orange colour by a transparent solution of lime; any of the fixed acids re-dissolves this, and renders the turbid liquor again transparent. A more delicate test for corrosive sublimate is galvanic decomposition, which may be thus simply performed. Place a drop of the solution of corrosive sublimate on a gold coin, press on it a slip of tin foil, or copper leaf, the mercury is reduced, and precipitated on the gold, forming a white spot, which may be removed by dilute nitric or muriatic acid.

I am, Sir, your obedient servant,
A MEMBER OF THE LONDON MECHANICS' INSTITUTION.

IMPORTANT HINTS TO TEA DRINKERS.

TO THE EDITOR.

SIR,—The injurious effects of tea, more particularly of green tea, arise from its containing a considerable quantity of free gallic acid. This may be rendered evident by adding to an infusion of the leaves a few drops of a solution of green copperas, which will turn the liquid black. This acid is a powerful astringent, and in peculiar habits of body occasions all the inconveniences arising from obstinate constipation. To prevent these evils, I have found a few grains of carbonate of soda, mixed with the tea, an infallible specific. A neutral salt, the gallate of soda, is thus formed, which is a mild aperient, and renders those medicines which the strong tea drinkers so frequently require unnecessary. The quantity of acid contained in tea may be fairly estimated by noticing the effervescence which occurs when carbonate of soda is added to the infusion. The deep colour of the infusion is greatly increased by the alkali, and its taste is wholly uninjured by it, if not actually improved. Thinking this may be useful information to many of your numerous readers, I beg your insertion.

I am, Sir, your obedient Servant,
J. H. G.

SCIENTIFIC INSTITUTIONS.

LONDON MECHANICS' INSTITUTION.—ON Wednesday, June 25, MR. P. CHRISTIE concluded the first division of the course of Lectures on *Architecture*, when the members were informed, that on Friday, June 27, MR. COBBIN would deliver a Lecture on *Stenography*; that MR. HEMMING would resume his *Chemical Course* on July 9th; and that MR. R. CHRISTIE had been requested by the Committee, and had undertaken to fill up the vacant Wednesday, July 2nd, with a Lecture on *Planetary Motion*.

NEWCASTLE LITERARY SCIENTIFIC AND MECHANICAL INSTITUTION.—By the Fourth Annual Report, which has just reached us, we are happy to learn that the prosperity of this Institution is rapidly increasing. About 150 new members have been admitted during the year, but the Committee's Report does not state whether the number of members has been increased or diminished since their last Report, their present number being 619. The Library has received an increase of 550 volumes, and the managers take great credit to themselves for bestowing all their money, and the greater part of their attention on this department, instead of "wasting their resources in shewy and evanescent lectures," which they state has been the case in many similar institutions, probably where "shewy" or well illustrated lectures are more easily obtained than at Newcastle-upon-Tyne. At the same time it is stated, that the lecture system has not been neglected, as sixteen papers, or lectures, have been read since the last anniversary, gratuitously; amongst which may be mentioned a paper communicated by Henry Brougham, Esq. M.P. *On the Principles of Chemistry*. Some other matters in this report may require a further notice at a future opportunity.

MANCHESTER MECHANICS' INSTITUTION.—The Annual Report of this Institution has just come to hand, but we have not room to notice it in the present Number.

NATIONAL REPOSITORY FOR THE EXHIBITION OF NEW AND IMPROVED MANUFACTURES OF THE ARTISANS OF THE UNITED KINGDOM.

ON Monday and Tuesday this Exhibition was open for private inspection, and on Wednesday, for the public. The display, considering the shortness of the time allowed for getting in the specimens, and completing the arrangements, fully answered our expectations. We must, however, observe that the selection did not quite correspond with what the title might lead to expect, at the same time it far surpassed what might reasonably have been expected, considering its limited publicity. We wish by this to be understood, that many of the articles exhibited were not new, although of such ingenious structure, and useful applications, that they fully merit their present introduction to the public. In the Mechanical Department, we observed Jones's Patent Suspension Wheels.* A most admirable Rain Guage, on the principle of Crosley's Liquid Measure. A very convenient Portable Forge, from Messrs. Holtzapffel's. Masterman's Bottling* and Corking* Machines, and a

* Those marked with asterisks, and many others that we shall notice hereafter, have been described in the Register of Arts.

very ingenious combination of the Table Urn and Tea Pot, in which either tea or water may be drawn from the same cock at pleasure. An Improved Filtering Machine. Yeardley's Portable Mill. Redmund's Rising Hinges. In the Manufacturing Department, we observed a most beautiful display of cutlery from different manufacturers in Sheffield, and an elegant Steel Fender, a Turning Lathe, and complete set of appendages, very highly finished, from Messrs. Holtzapffil's; and several articles in the way of tools, and some elegant specimens of the applications of their machinery. Two bronze models of the Warwick Vase, and one of the Parthenon, at Athens, from Mr. Thomasins, Birmingham, being beautiful specimens of casting in metal, imitations of the Portland, and other Vases, from Wedgewood's. In the manufacture of Fabrics, three beautiful examples of Looms were actually at work, the one on an improved plan, operating without the drawboy, was producing beautiful specimens of a French figured silk; this loom has been in action in Spitalfields these three or four years past. A Ribbon Loom, and one in a side room was employed in making gauze. A variety of specimens in the Silk, Muslin, and Shawl Departments, were deposited on the tables. A good shew of Mecklin, and other laces. Berrolas's Keyless Watch.* This Establishment, amongst other objects, includes superior specimens of workmanship, and matters of taste, amongst others, there were many beautiful Lithographic Prints, and a very singular representative of a female figure in bas-relief in wool, and a landscape painted on the same material. A good assortment of Turnery, and carved work, from Calvert's, Fleet Street. A set of well finished models, shewing the progressive improvements in the Steam Engine, by Mr. Kirby, &c. &c. We cannot afford room for a more extended list, but we feel convinced the public will find this a very successful opening, considering the difficulties attending such an undertaking.

MISCELLANEOUS INTELLIGENCE.

Mines of Malacca.—We are informed by the *Malacca Observer*, of the 6th of November, that the mines in that quarter are so enormously rich, that a single workman might obtain from them one catty and a half of gold in a year; that three hundred persons, therefore, would obtain four hundred and fifty cattys, or 225,000 Spanish dollars. When this splendid looking statement, (at which we perceive the reader's eyes glisten), is placed in the crushing mill of arithmetic, and the hacienda of common sense, we find that 225,000 dollars are £40,000, or £133. 6*s*. 8*d*. per man, from which are to be deducted the cost of tools, &c. the wages of the miners, and the pay and provender of a regiment of sepoys to protect them!—*Weekly Review*.

The Opera House at Lisbon is a fine building, with a handsome portico; was built and completed in five months, in 1793. The corridors throughout are vaulted, as are the staircase, also that which leads to the several tiers of boxes, while the vomitories are so numerous and skilfully distributed, that the interior of the theatre, in case of fire, can be instantaneously cleared. The architect was an Italian, of the name of Joseph da Costa e Silva. The interior contains five tiers of boxes; and upon the cieling, in an elliptical form, are represented the heavens, with the lunar and planetary system. Over the proscenium there is a large clock placed, rather in advance, whose dexter supporter is old Time, with his scythe, and the sinister, one of the Muses playing on a lyre. A figure of Cupid surmounts the

clock. Between the two columns, on either side of the stage, are figures representing the tragic and the comic muse. The royal box occupies the entire segment of the circle, cutting perpendicularly the five tiers of boxes, which gives it an elevated and imposing appearance. There are one hundred and twenty boxes, and the pit here, as at Paris, and elsewhere, reserved for male spectators, may contain about seven hundred persons; the price of admission to this part of the theatre being half a crusado novo, and for a box on the lower or principal tier, sufficiently capacious to contain five or six chairs, half a moidore, or about ten shillings. The operas are given on the nights of Monday, Wednesday, Friday, and Sunday, generally commencing about half past eight, and concluding before 12.—"*Portugal Illustrated*," *by the Rev. W. Kinsay*, 1828.

Mr. Gordon's Steam Carriage.—We are happy to be able to state that the trials hitherto made with this carriage are calculated to inspire confidence in its ultimate success. It has happened in this machine, as in all previous machinery heretofore accomplished, where a difficult operation is to be performed, that must *adapt itself to uncertain and varying circumstances*, that every succeeding experiment points out to the watchful observer something that may be improved. The construction of a steam coach is an undertaking fraught with numerous and great, though (we firmly believe) not insuperable difficulties, when money, talent, and perseverance, are brought into operation to overcome them as in the present instance.

The last experiment was made very early on Friday morning last on the Kingsland Road. The carriage ran extremely well a few hundred yards, when it was proposed to make a turn and run home. The space taken to do this was a circle 7½ yards in diameter (a turn much too sharp for such a large carriage), in completing which three bolts of the connecting rods were broke. It was likewise determined that the steam cylinders were too small to effect the requisite speed with safety to the machinery. Other cylinders are now being substituted, and some improvements have been introduced in the propelling parts, which we shall describe when we announce the next experiment.

LIST OF EXPIRED PATENTS.

Continued from page 128.

GLASS.—To Joseph Price, of Gateshead, Durham, for several new methods of making glass.—Dated May 5, 1814.

PAINTING.—To John V. Jekenham, Esq., for a new material for painting walls, and the mode of applying it.—Dated May 17, 1814.

SAFE.—To T. A. Pickering, of Hackney, for a method of preventing the loss of parcels by coaches.—Dated May 21, 1814.

MACHINERY.—To W. Moult, of Bedford Square, for an improved method of acting upon machinery.—Dated May 21, 1814.

FENCES.—To W. Neville, of Birmingham, for a method of making hurdles, gates, verandahs, &c.—Dated May 26, 1814.

TO OUR READERS AND CORRESPONDENTS.

The subjects mentioned by T. M. cannot be inserted until after the annual volume of the Transactions has been published.

Mr. Gilbertson's favour has been received.

NATIONAL REPOSITORY

FOR THE EXHIBITION OF

SPECIMENS OF NEW & IMPROVED PRODUCTIONS

Of the Artisans and Manufacturers of the United Kingdom,

ROYAL MEWS, CHARING CROSS.

SINCE the hasty notice in our last number of this important establishment, we have made several visits to it, to examine the numerous models and articles exhibited, and were much gratified to find the collection progressively increasing, and that it bids fair, eventually, to realize the hopes of its liberal-minded and patriotic projectors. From the extensive circulation of our Journal among the engineers, artisans, and manufacturers of the kingdom, it has occurred to us that it might promote the objects of the Institution, and likewise afford valuable information to our readers, by giving *a brief account of every article it contains, with detailed descriptions and engraved illustrations of such machines and models, as from their novelty, utility, or ingenious construction, may be deserving of particular notice.* In doing this, we shall not be departing from our legitimate course, as it will be seen that a great portion of the subjects are *new patent inventions.*

The objects of the Institution are sufficiently expressed at the head of this article. It is under the direction of the following

BOARD OF MANAGEMENT.

Chairman—The Hon. G. AGAR ELLIS, M.P. F.R.S.

George Birkbeck, M.D. F.G.S.; John Hales Calcraft, Esq.; John Earl of Clare; Henry Drummond, Esq.; Hugh Viscount Ebrington, M.P.; Hon. G. M. Fortescue, M.P.; George Granville, Earl Gower; Lord Francis L. Gower, M.P.; John Labouchere, Esq.; George Viscount Morpeth, M.P.; Hon. Granville Ryder; Dudley Viscount Sandon, M.P.; C. Baring Wall, Esq. M.P.; Alexander R. Warrand, Esq.; Hon. J. Stuart Wortley, M.P.

Treasurer, J. Labouchere, Esq.;—*Secretary*, T. S. Tull, Esq. *Bankers*, Messrs. Williams, Deacon, Labouchere, and Co.

CHAIRMAN OF COMMITTEE OF INSPECTION.

GEORGE BIRKBECK, M.D. F.G.S.

OUTLINE OF PLAN.

First Class—Entirely new and ingenious constructions of any sort, where a new principle is discovered, or one before known, but never practically adopted, is brought into operation.

Second Class.—New adaptation of some known principle, but in a manner essentially different from all that has been done before in that line of manufacture or mechanical workmanship.

Third Class.—Every sort of improvement upon a discovery already made, by which the preparation of any article is facilitated, or its utility increased. In this class may be exhibited also such objects as are highly finished, or distinguish themselves by exquisite taste; likewise every description of elaborate workmanship, such as would not find a place in an exhibition of arts.

Constitution of the Sub-Committees of Inspection.—Chairman to be in profession a civil engineer; ditto, a person well acquainted with chemistry and chemical arts; ditto, a person well acquainted with silk, cotton, woollen, and linen manufactures; ditto, a mathematical instrument maker; ditto, a person well acquainted with workmanship in all kinds of metals.

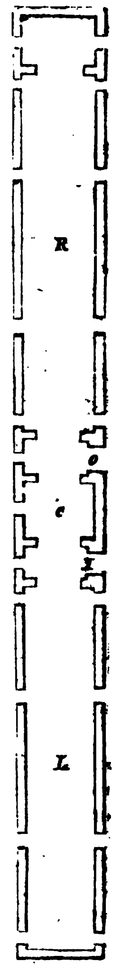
It has been Resolved.—That the decision of the sub-committees, with regard to the reception of articles submitted to their inspection, as well as to the class to which they may belong, is final, when such decision shall have been signed by the chairman of the general committee of inspection: and that the presidents, vice-presidents, and secretaries, of all the Mechanics' Institutions in the united kingdom be invited to take on them the office of committee of inspection, with power to add to their number in their respective districts, with the same power of deciding upon the admission of articles as the London sub-committees of inspection; and that a circular letter to that effect be written and forwarded to the several presidents of the Mechanics' Institutions, signed by the chairman of the committee of inspection.

Persons resident in London or its vicinity, who may be desirous of availing themselves of the advantages of the ensuing exhibition, are requested to forward the particulars, with a full description of the articles designed to be sent for exhibition, in a letter addressed to the secretary, and to wait an answer to such letter, which will be sent to their address previously to their forwarding any package containing such articles for reception at the National Repository. Artisans and manufacturers residing at a distance from the metropolis are requested to make application to the president or secretary of the Mechanics' Institution nearest their residence.

*** *No charge will be made for a grant of a place in the gallery upon any articles that shall have been approved of by the committee of inspection. All letters sent by post must be paid.*

All specimens sent to the National Repository must remain under the control of the board of management until the close of the exhibition; when they will be re-delivered to the owners, unless, at their request, such specimens shall have been sold; in which case, the amount received will be paid to them or to their order, on application at the Repository.

That part of the King's Mews at present occupied with the exhibition, is the upper gallery of the south-west side, nearly opposite to Pall Mall. This gallery we annex a plan of in the margin.



It measures inside 248 feet long, and 20 feet wide, and has numerous doors (shown on the plan by openings in the walls) leading into a series of rooms, ranging the whole length of the gallery on both sides. These rooms, 35 in number, are at present only in part appropriated: such as secretary's private room, board room, counting house, &c.;—some are particularly reserved for the reception of products as they arrive from our chief manufacturing towns,—as Birmingham, Leeds, Glasgow, Macclesfield, Manchester, Nottingham, Sheffield, &c.

The *entrance* for the public (who pay one shilling each person for admission) is at *I*, which is the top of a stone stair-case leading from the street. The egress is by descending another similar stair-case from *O*; but persons having free admissions, which is the case with all those who have articles exhibited in the gallery, and also some persons like ourselves, connected with the periodical journals, enter at the egress door *O*. *C* indicates the Centre room; *L* the Left room, and *R* the Right: beyond *R* there is another small room, occupied by a large loom at work, weaving curiously-figured silk by the aid of a jacquard. These several rooms, if they may be so termed, are only half divided by open arches, (as represented on the plan) and strictly speaking, constitute but one gallery.

Upon commencing our task of taking memoranda and sketches of the subjects, we took them all in regular succession as they were first placed in the room, but in our subsequent visits we found many of the articles had been shifted to other places; consequently, our account cannot be given in the order intended; it will, however, contain every subject, with reference to the particular room, (as *L*, *R*, *C*, *O*, or *I*,) where we last saw them, and where they will, probably, now remain until the close of the session.

Our present number will only embrace a description of several models in the rooms *L* and *O*. The first we shall insert is,—

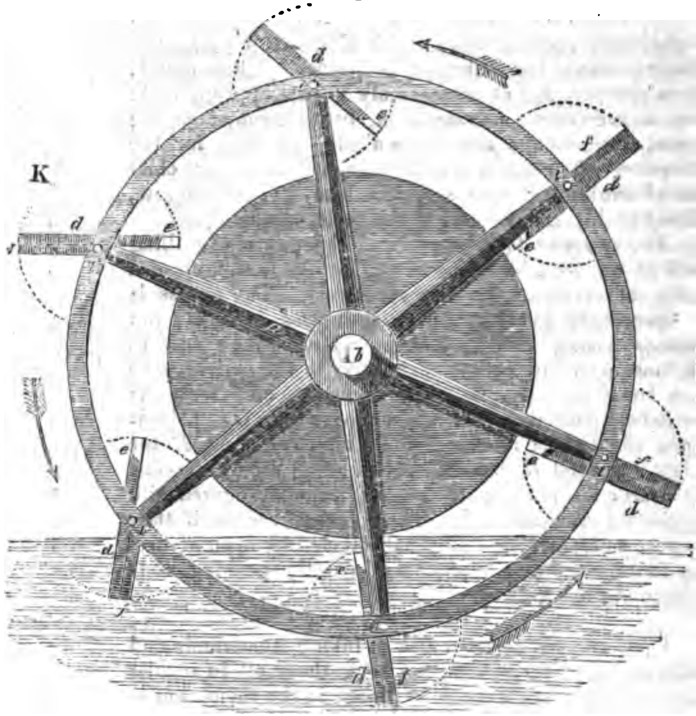
MODEL OF A NEW PATENT STEAM BOAT PADDLE WHEEL,

By LIEUTENANT SKENE, R. N. of Woolwich.

Room L.

THIS invention is proposed by the patentee as an improvement upon the paddle-wheels of steam boats, and also of the common water-wheels employed in driving machinery on land. The form and full size of the paddles is a parallelogram, 1 foot deep by 2 feet wide, terminated by a semicircle of 1 foot radius. These paddles

Fig. 1.



are not immoveably fixed, but vibrate on axes passing through the two opposite annular plates that form the periphery of the wheel, in order to allow of their dipping into the water edgeways, and thereby to reduce the resistance of the water to the revolution of the wheel. For this purpose, the lower or semi-circular portion of each paddle is loaded with metal, the superior gravity of which to that of the upper portion, causes each paddle successively, as it enters the water, to assume the vertical position; and to prevent their turning over, a simple stop is provided (which will presently be explained) so that the full effect of the impelling power of the engine may be given to each paddle, at the proper time. To prevent the water from escaping sideways between the arms of the wheel, a large disc or circular plate* is fixed against the internal sides of the wheel, and of such diameter as not to come within the range of the paddles, as they vibrate on their axes.

The number of paddles to each wheel, is to be regulated by the diameter of the wheel; which is, for every foot in diameter one paddle; therefore, for a six-foot wheel there are to be six paddles,

* In the model at the National Repository these plates are polygonal, but the circular form is obviously preferable.

which is the number represented in the prefixed engravings. The patentee states that the *paddles* should never exceed two feet in breadth; but vessels that require a greater breadth of *wheel*, should have an additional rim attached to the axis of the wheel, within which the additional series of paddles are to be placed; but the axes of this series of paddles are not to be in the same horizontal lines as the axes of the others, but midway between each, in order that the paddles of each series may enter the water in alternate succession, because by such arrangement the motion will be rendered more equable.

Fig. 1 represents a side elevation of the wheel with the paddles consequently viewed *edgeways;* and Fig. 2 (annexed) exhibits a single paddle, *flatways,* on a larger scale: the same letters of reference in each figure indicate similar parts.

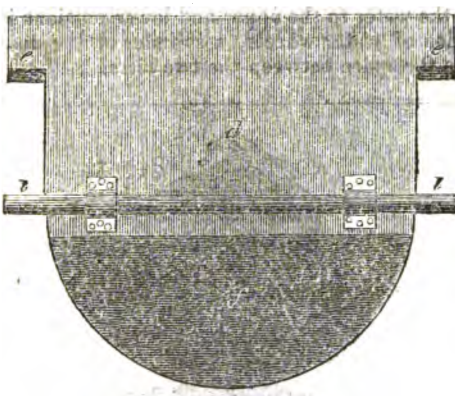


Fig. 2

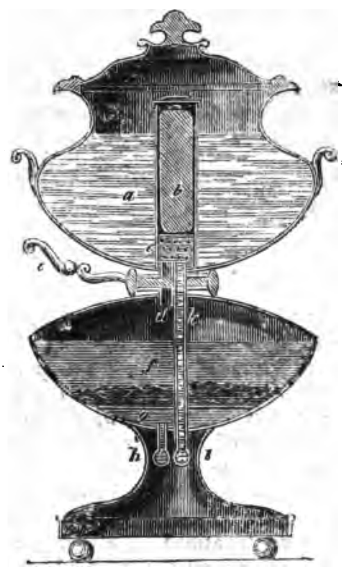
a a a are the arms of the wheel revolving upon the shaft *b; c* is the circular plate to keep the water from passing laterally; *d d d* are the paddles, of which *f f f* are the loaded sides; *l l l* are the axes of the paddles; the dotted arcs of circles at the extremities of the paddles, show the range of their motion, which is arrested by the stops *e*, that consist merely of a prolongation of the upper sides of the paddles striking against the arms, or the inside of the rims of the wheel. The arrows show the direction in which the wheel turns.*

From the preceding account, the action of these wheels is too obvious to require any explanation. We understand that they have been applied to a steam boat on the Thames, and the experiments made have been reported in the newspapers as highly successful; but not having been present ourselves, we cannot attest the correctness of the statements, which theory would lead us strongly to doubt.

* Our draughtsman has represented the paddles K K in the position he considered they would assume during their revolution, but it appears to us that they should have been drawn with their circular ends depressed from the effect of their gravity, according to the intention of the patentee.—EDITOR.

It will be observed, that by this arrangement, the paddles as they *ascend* out of the water are subjected to precisely the same amount of resistance, as the common wheels wherein the paddles are *fixed*, by having to lift the tail or back water; and if the wheel is made to revolve rapidly, the centrifugal force will prevent the paddles as they *descend* into the water from assuming the vertical position (as shown in the drawing), consequently no advantage will be gained; but we will suppose the wheel only revolving at a moderate rate, still the centrifugal force will, to some extent, counteract the effect of the loaded paddle, and to this must be added the resistance of the water against the loaded part of the paddle, which first strikes it; sufficient together, we should imagine, to throw the paddles into the radial, position, and cause them to encounter the same resistance as in the ordinary wheels.

In paddles of the form delineated (fig. 2) the patentee states the resistance of the water to the upper and lower portions is equal. In the construction of water wheels, a cylinder of the diameter of the discs occupies the space between the two rims.



SHARP'S PATENT TEA URN.

Room L.

This is rather an elegant article of luxury, than one of real utility. It is a combination of the tea urn and tea pot in one vessel.

The above engraving gives a vertical section of the apparatus; *a* is the ordinary urn or vessel that holds the water; *b* the red-hot

heater in its case; below the bottom of the case, the tube is prolonged so as to form a small chamber underneath, which is perforated at its sides with minute holes, through which the water passes by a tube *d* into the tea vessel *f*, when the valve (shewn in the figure as closed) is opened by turning the lever *e*. The infusion is represented by a deeper tint in the engraving than the water above it, and the tea leaves, by masses, still darker, as lying upon a grating, or perforated bottom; through the holes of which the tea passes clear to the lowest chamber *g*, from whence it is drawn off as wanted by the tube and cock *h*, a transverse section of which can only be seen in this view. The plain water is drawn from the vessel *a* by means of the long tube *k*, (which passes directly through the tea chamber), and the cock *l*. It should now be noticed, that both the cocks *h* and *l*, are enclosed in one tube or external case, and, therefore, appears as one only—but having two lever handles; that on the left being the tea cock, and that on the right the water cock.

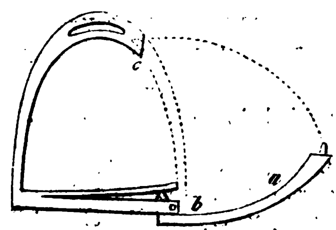
It is a common remark, that tea made from the water in an urn is never so good as that obtained from the tea kettle, on account of the difficulty of keeping the water boiling hot. To remedy this disadvantage, we will here take leave to submit to tea urn makers another arrangement. Let the tea vessel be placed over the water vessel, (not in it, as the boiling heat would be too great), and the metallic supports which connect the two vessels would conduct sufficient heat to keep the infusion at a proper temperature. Underneath the water vessel burn a spirit lamp, instead of inserting the red hot heater, which is a very inconvenient, and by no means an economical mode of heating.

PATENT STIRRUP,

By Mr. Green, of Lisle Street, Leicester Square.

Room L.

The object of this invention is to prevent the foot of an equestrian becoming caught in the stirrup, when falling, and, in consequence, being dragged by the horse along the ground. Many fatal accidents have been caused from the want of such a contrivance as the present, and probably many lives have been saved by its use. The invention is not new, we have used them twenty years ago, and should be happy to see them appended to every saddle, until something still better is introduced.

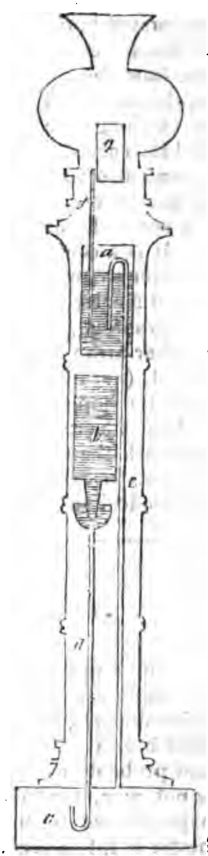


The engraving scarcely needs explanation: one side of the stirrup *a* separates from the upper part at *c* when pressed upon by the foot of the rider, and turns upon a spring joint *b* at the bottom; in this position the side piece *a* remains, until it is pushed back again, when the spring locks it fast again.

PATENT FOUNTAIN LAMP,

By Mr. Bright, of Bruton Street.

Room L.



We are happy to find that the valuable suggestions thrown out by our correspondent, J. M., in the construction of hydro-pneumatic lamps, have been productive of some improved modifications of these interesting and useful machines. Mr. Bright's lamp is precisely on the same principle as that described in our 24th number, new series, and we are free to confess, that by a simplification of the parts, it is some improvement. It is the best fountain lamp hitherto made, and as such, we hope it will be extensively adopted.

To explain its principle our sketch is made to represent a vertical section. The water vessel *b* is an inverted fountain which empties itself into the air chamber *c*, through the pipe *d*; the air thus displaced is forced up the rising bent tube *e*, into the oil vessel *a*, from whence as it cannot escape it presses upon the oil, and forces it up the pipe *f* to the burner *g*. It will be seen that by this arrangement the two columns of oil and water will always be in equilibrio.

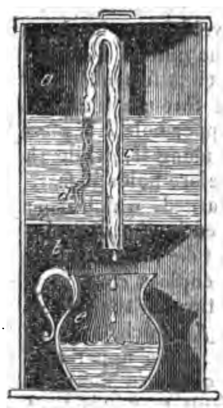
We have confined ourselves to a section of this lamp, as we considered the ornamental pillar which encloses it by no means an elegant one, and would recommend the manufacturer to get a better design from some tasteful and scientific draftsman.

FILTERING MACHINE BY CAPILLARY ATTRACTION.

Room L.

This invention reminded us of an observation made to us by a friend the other day who said he was going to Paris (from London) by way of St. Petersburgh, for certainly the inventor of this machine has taken quite as circuitous a route to arrive at his object. The original model in the Repository consists of an iron japanned bottle

with a long neck, inverted, and supported in that position by three legs, and partly by the said long neck passing through a kind of box, and finally dipping into a shallow tray, which first receives the water from the inverted bottle; the shallow tray is only half the width of an open reservoir underneath, and rests upon ledges to slide backwards and forwards upon, like a drawer; in this vessel one, two or more cotton wicks are placed with their ends hanging down into the reservoir for conducting the water therein by capillary attraction. Now, nearly all the parts of this singular apparatus are useless; the only vessel required being the reservoir, with a pipe to hold the wick in the manner we have represented it in the annexed drawing, for which we take no credit to ourselves, as it is only another application of Mr. Barton's patent lubricator, for the bearings and journals of machinery, (described in our Vol. I. N. S. p. 339,) by which the oil is filtered, and allowed to descend in uniform regulated quantities.

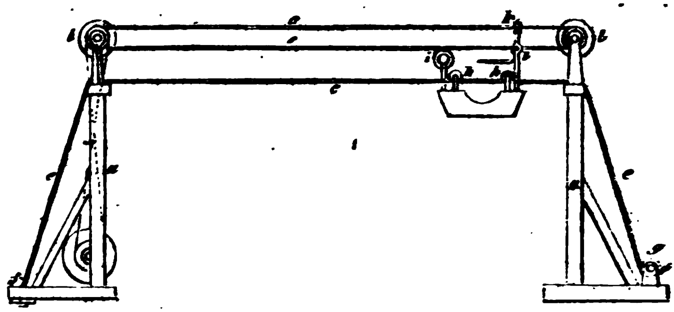


a is the reservoir; *b* the lower compartment, *c* an open tube soldered into the bottom of the reservoir, in which is put the wick of cotton or wool *d*, (the latter is the best), with one end lying immersed at the bottom of the vessel. The water in rising through the interstices between the filaments, deposits the gross matter floating therein, and descends in a clear and comparatively pure state into the vessel *b*, or in a jug placed to receive it. We are not aware of a more commodious apparatus than this for the purpose; though it might certainly be performed at a still less expence, by employing a garden pot, with a reed inserted into the bottom hole for the tube, and supported in any convenient manner.

MODEL OF A WIRE SUSPENSION BRIDGE.

Room L.

This is intended for conducting cars, carriages, or other vehicles across rivers or vallies. It consists of a strong wire, chain, iron rod;



or cord, *e e e*, which passes over the supports *a a*, to which one of the ends is firmly fixed as at *f*, and adjustable by tightening screws at the other end, after passing under a roller *g*: *c* is an endless cord passing over the pulleys *b b* on the supports, and round the pulley *i*, which is attached to the vehicle to be dragged across. The vehicle is supported on *e e e* by the pulleys *h h*. It is attached to the endless cord by the stem *k l*, which is furnished with two holes to admit the cords at *k* and *l* passing through the stem at right angles to each other, so that when the upper hole *k* is placed in the direction of the cord, it will pass freely along it, while the lower hole *l* is placed across the cord, and therefore holds it fast, and is dragged along by it; but if the stem be turned, which it may be by the handle at *l*, so that the hole *l* is placed in the direction of the lower cord, the the reverse operation will take place, and the vehicle will be dragged by the upper cord. The endless cord may be put in motion either by the persons in the car turning the pulley *i*, or by persons turning the wheel at the station *f*, which is connected by an endless chain or band to the pulley *b*. This apparatus, we are told, is a very ingenious, clever, and economical method of making a suspension bridge, and we have no fault to find with it, except that it will not answer the purpose intended. In the first place, in order to obtain the requisite strength, it will be necessary to permit the principal cord or rod *e e e* to take the catenarian curve between the supports; and, secondly, if the main support be permitted to take that curve, the cord *c* will not perform its part of the business.

PATENT INSTRUMENT FOR DRAWING IN PERSPECTIVE,

By F. Ronalds, Esq., of Croydon.

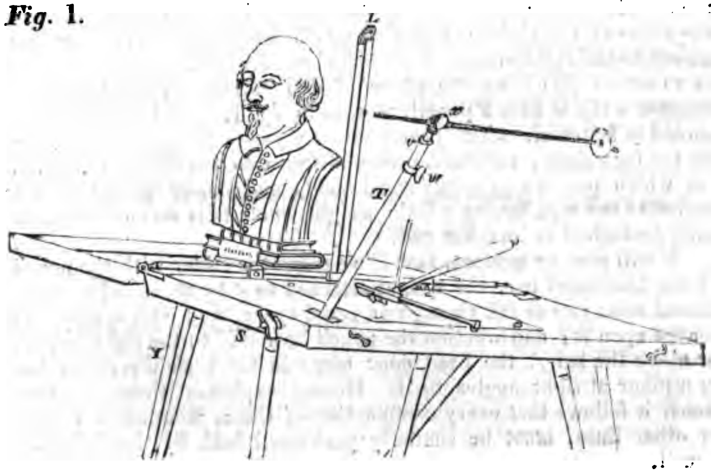
Room L.

This instrument is "for the expeditious, faithful, and free delineation of figures, landscapes, buildings, copying pictures, flowers, &c. &c." There have been various mechanical apparatus constructed at different times to assist in making correct drawings of objects, without that entire dependance to the eye, by which the artist is expected

to produce his pictures; the most complete of these have only served to determine one particular part at a time; for instance, the point at the top of an object, as the corner of a house, and then the bottom point of the same object, the connection of these two points by a line being that line of the picture which represents the part of the house to which the adjustments have been made. As this is the nature of their general action, and it will be immediately perceived their progress must be extremely slow: even the most simple figure would require to have many points found in it, before its outline could be produced; and if it consisted of curved or irregular lines, many more points must be taken in each curve, to get a correct delineation. The instrument we are about to describe, instead of taking points only in the picture, is applied to draw the lines themselves of whatever form or arrangement they may be. Previously to entering on its description, we must, however, refresh the minds of some of our readers, as to what constitutes a perspective drawing.

We are sensible of the existence and form of bodies situated before the eye by rays of light proceeding from every part of all objects in every possible direction in straight lines; that portion of them which proceeds in the direction of the eye, enters it and produces from the peculiar formation of the eye an image on the retina, giving us through the agency of the nerves, that sensation we term vision; thus, we see a house or a landscape; but if we wish to represent on some tangible material, a picture, or image of that house or landscape, we desire to produce a *perspective drawing*, such appearance, for instance, as these objects present upon a transparent medium, as a window situated between the eye and the object. This would be accomplished if we could (keeping the eye exactly in one position,) proceed over each of these lines on the glass with a pencil which would leave a trace. We should then produce a perspective drawing, and the glass would be denominated the plane of delinea-

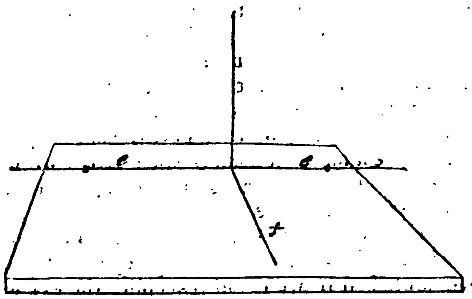
Fig. 1.



tion. Every true perspective picture is therefore an exact copy of the order in which the rays proceeding from the object represented, would intercept in their passage to the eye, a transparent plane at right angles to the direction in which the eye viewed that object; which plane is the plane of delineation of the picture, which is large or small according to its distance from the eye. By Mr. Ronald's instrument, a small bead is made to traverse freely in this plane of delineation; but the bead cannot make any movement whatever without a pencil mechanically attached to it, tracing down on paper lines precisely corresponding with the figure; in other words, while the bead traverses over the lines of the object, the pencil moving with it, does of necessity make an accurate perspective drawing.

The preceding cut, fig. 1, gives a view of one of the forms of the complete instrument, in the manner it is used—but the annexed diagram, fig. 2, will best enable the reader to understand the principle of its action.

Fig. 2.



The instrument consists of a straight bar *e e*, moving horizontally on two rollers attached to the table; *f l* are two other bars fixed at right angles to the bar *e e* and to each other, the former lying on the drawing paper, (horizontally) the latter placed perpendicularly in the plane of the picture, all being attached together; if the bar *f* be moved to the right or left, the vertical rod *l* will slide on the rollers in a vertical plane, or the plane of delineation. To the bar *f* is adapted a slider with a pencil, as seen in fig. 1, to this pencil a silk thread is fastened, which passes under a pulley in the corner where all the bars meet; thence it proceeds upwards parallel to the bar *l*, (at which part it carries the small bead) and finally passes over a pulley at the top, having a little weight which falls down the bar or tube *l* attached to its other end.

It will now be evident, that if we move the slider with the pencil on the horizontal bar, the weight attached to it by means of the silk thread must rise or fall through an equal space, and with it the bead placed upon it; and whether the pencil be moved to the right or left, or along the bar *f*, the bead must move in the same direction, but in a plane at right angles to it. Having explained these two motions, it follows that every combination of them, whether in curved or other lines, must be similarly performed both by the bead and pencil.

In using the instrument, it is requisite to arrange the sight hole, attached to the bar T, (through which alone the operator must use his eye in sketching,) and the position of the bead on the thread so as to get the drawing within the limits of the drawing-paper. The handle, which is attached to the slider with the pencil by an universal joint, must now be moved about, causing the bead to traverse over every line of the object, which, being marked down by the pencil, we have a fac-simile of the motions of the bead in the plane of delineation. We have in this most ingenious instrument a simple and elegant adaptation of the foundation laws of the science of perspective; it may be called a teacher of perspective as well as a perspectograph.

These instruments are constructed of various sizes, and packed in cases, including a book of instructions, at very moderate charges. They are manufactured by Messrs. Holtzapffel, of Charing-Cross, in their usual superior style of workmanship.

MODE OF OPENING & SHUTTING WINDOWS.

MODEL, representing an improved Mode of Opening and Shutting the Windows of Churches and other Public Buildings, for the purpose of Ventilation,—By W. and D. BAILEY, of Holborn.

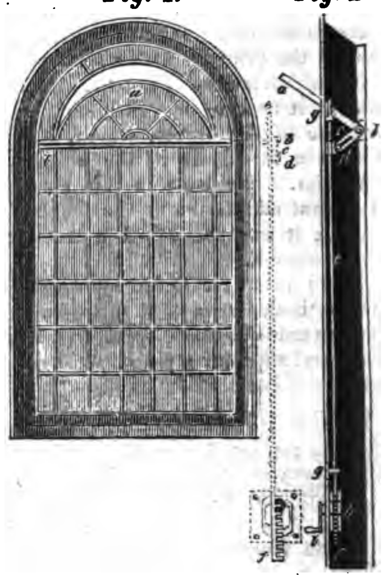
Room O.

It has frequently been a subject of complaint that our public edifices are either insufficiently provided with the means of ventilation, or the arrangements for that purpose are very inconvenient. The oldest mode with which we are acquainted, is that of casements hung upon hinges and fastened by a latch; a later and improved mode was to hang the casements so as to swing on centre pivots: the opening and shutting of these casements by pulleys and lines, is always accompanied with noise, and they afford no defence from a shower of rain, nor to the prejudicial effects of the cold air descending on the heads of the persons assembled near to the windows. Another mode lately introduced, is to cut out of the windows a space to receive the half of a glazed hopper, which is attached to the window projecting inwards, having a flap on the top, lying horizontally, and opening upwards. These hoppers are extremely unsightly in themselves, but are rendered still more so by the dust which lodges on them, which dust is blown into the building when the flap is opened for the admission of air.

By an inspection of Messrs. Bailey's model, or of the annexed engraving, it will be perceived that the before-mentioned inconveniences are obviated, and a ready mode of action on the upper part of the window is obtained by very simple machinery, while the symmetry of the window is preserved. It may be proper to observe that in case of the upper part of the window being square, and not having any mullions, it will be found necessary (to prevent the entrance of the air at the sides of the casement when it opens) to have a frame with two angular sides attached to the windows, and these sides must have a small return rebate for the casement to fall against when it is fully opened, which will prevent any inconvenience arising from the form of the window.

Fig. 1 gives a front inside view of a window, with the apparatus attached; and fig. 2 is a side view of the same. *a* shows the flap of the window open; *b b* a bar to which the base of the flap is fixed, and on which it turns: *c* a lever, having one end fastened to the extremity of the bar *b*, and furnished at the other end with an eye, which receives the pin or stud *d*; this stud is fixed on the vertical rod *e*, which terminates below in a rack *f*, and is secured in an upright position by the loops or guides *g g* through which it passes: *h* is a lanthorn pinion of two teeth, which when turned round by means of the winch *i*, takes into the notches of the rack, and, consequently draws down the rod *e*, or raises it according to the direction in which the winch is turned.

Fig. 1. *Fig.* 2.



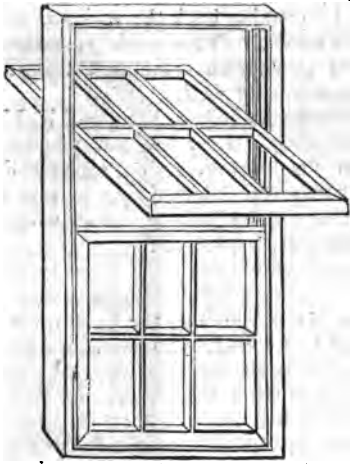
In the first case the stud *d* draws the lever down, and consequently *opens* the window; in the latter, the stud is raised, and with it the lever, which *shuts* the window.

TUELY'S PATENT REVOLVING WINDOW.

Room O.

This is a very simple invention, and calculated to effect the object intended, that of preventing accidents in the cleaning and repairing of windows; but it is much to be regretted that Mr. Teuly was not aware before taking out his patent,* that a contrivance exactly similar to it in every essential particular, was invented fourteen years prior by Mr. G. Marshall, of Cecil Court, St. Martin's Lane, who received for it a bounty from the Society of Arts, in whose "Transactions," in the year 1810, it is fully described with an illustrative engraving. We are bound in justice to the earliest inventor to mention this fact; and to shew that we are perfectly correct in our statement, we have extracted from the 28th vol. of the above-mentioned " Transactions" the description is therein given, but in an

* We have noticed within a short period more than fifty patents for machines and processes that had not only been previously invented, but described and published in the periodical journals devoted to such subjects, more than half of which had appeared in this work. This dreadful waste of time and money can therefore only be attributed to the parties not reading this and similar works.



abbreviated form, together with the annexed drawing, which our readers will find to be equally descriptive of Mr. Tuely's invention.

"Servants and others employed in the cleaning and repairing of sash-windows, in general provide so indifferently for their security, while employed on the outside, that numerous accidents occur. One circumstance of this kind, which immediately led to the present invention, was that of a man standing on a board cleaning the outside of a window, when the board giving way, the man was impaled upon the railing of the area below. Various other accidents of an equally deplorable nature, have been owing to the same cause. The construction of sash windows now proposed will not only effectually prevent these accidents, but will remain a permanent convenience to the house in which it is adopted. In appearance the new sashes resemble those of the common kind, and the upper and lower sash may be moved up and down in a similar manner. The outside of the sash may also be turned into the room, so that it may easily be painted, glazed, or cleaned, by a person standing within the room, without the necessity of removing the slips or beadings: by doing which the glass is frequently broken, and the beads lost, left loose, or dismatched, and a considerable expense incurred."

"Old windows may be altered to act on this principle, at an expence of 12*s*. per window; and in making new sashes and frames, the improvement will add but 6*s*. to the common price."

"The frame of the window is fitted with grooves, weights, and pulleys, in the usual manner; the fillets on the sash are not made in the same piece with the sash frame, but fastened thereto by pivots about the middle of the sash; upon these pivots the sash is turned round at pleasure, so as to get at the outside without disturbing the fillets or grooves. When the sash is placed vertically (as the lower one in the figure) a spring catch on each side of it shoot into and take hold of the sliding fillets, so that in this case the sash slides up or down in the usual manner; but can be immediately released, and

turned inside out by pushing back the springs, and at the same time pulling the sash inwards." This mode of fastening the sashes to their sliding fillets is somewhat different from Mr. Tuely's, but it answers the purpose equally well.

A great many sashes have been hung on Mr. Marshall's plan, and given entire satisfaction. They are not adopted by builders who "run-up" houses for cheapness, on account of their additional expense; but that expense, incurred by a private individual building his own house, is scarcely worthy of notice when the advantages of the revolving window are considered.

ÆROSTATION.

We have seen Mr. Hemming, the Lecturer on Chemistry at the London Mechanics' Institution, who made an ascent with Mr. Green in his balloon from Stratford on Thursday evening. They remained in the air rather more than half an hour, and landed safely at Raynham, in Essex, about five miles beyond Romford. The wind was extremely high, and the motion of the balloon before its ascent for several hours was awfully violent. Mr. Hemming states, that after its liberation the motion was scarcely perceptible, and the prospect was highly delightful. Mr. Green was fearful of the balloon approaching towards the sea, which induced him to descend earlier than was intended. Mr. Hemming had made preparations for collecting the air at different altitudes, and intended to make observations on the temperature of boiling fluids at the greatest heights, but the weather was so unfavourable that the instruments could not be taken up. It was necessary even to remove the barometer from the car. Mr. Green displayed his usual skill and presence of mind.

LIST OF NEW PATENTS.

TYPE FOUNDING.—To Thomas Aspenwall, of Bishopsgate Church-yard, communicated to him by a foreigner, for an improved method of casting printing types, by means of a mechanical process, which invention he proposes to call the mechanical type caster. Sealed 22nd May. Six months for inrolment.

POWER ENGINE.—To Samuel Hall, of Basford, Nottinghamshire, for his invention of an apparatus for generating steam and various gases, to produce motive power, and for other useful purposes. 31st May. Six months.

CABLES AND ANCHORS.—To James Moffat, of Coleman Street, master mariner, for his having invented an improvement in apparatus for stopping and securing chain cables, also for weighing anchors attached to such chain or other cables, either with or without a messenger. 3d June. Six months.

FULLING MACHINERY.—To Daniel Jobbins, of Uley, Gloucestershire, millman, for his invention of certain machinery applicable to stocks or fulling machines for milling and scowering woollen cloths and other fabrics. 3rd June. Two months.

WATER PROOF LEATHER.—To Baron Charles Witherstedt, Commercial Road, for his invention of a liquid or composition for water-proofing or strengthening leather. 4th June. Six months.

GAS WORKS.—To Richard Witty, of Hanley, Staffordshire, engineer, for his having invented certain improvements in apparatus for making and supplying coal gas for useful purposes. 10th June. Six months.

POWER ENGINE.—To Edmond Gibson Atherley, Esq., of York Place, for having invented a method of generating power, applicable to various purposes. 12th June. Six months.

ALUM.—To Wm. Stratchan, of Avon Eitha, county of Denbigh, for an improvement in the manufacturing of alum. 12th June. Six months.

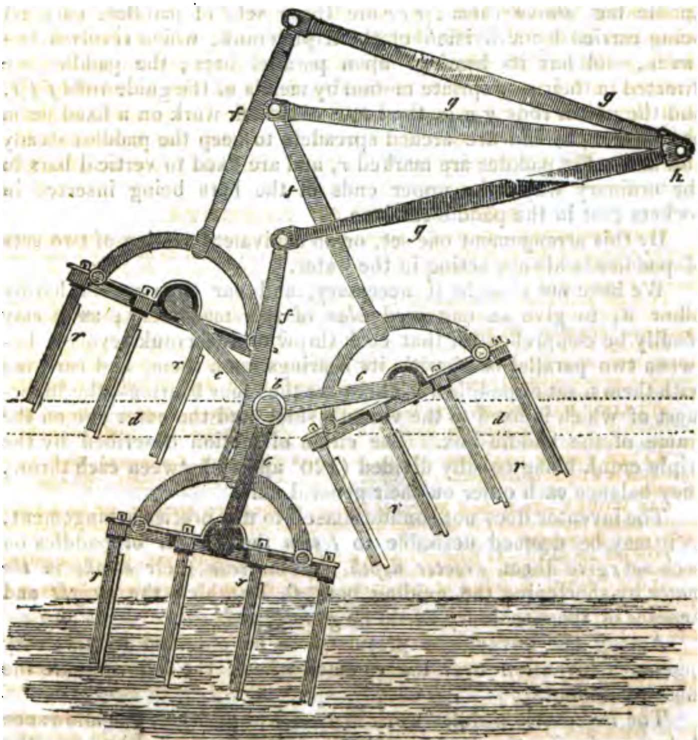
PREPARING FLAX.—To John Bartlett, of Chard, Somersetshire, for an improved manufacturing process for preparing flax, thread, or yarn, for use in the manufacturing of boots, shoes, saddlery, and of sails, &c. 16th June. Two months.

WINDLASSES, &c.—To George Johnson Young, of Newcastle-upon-Tyne, iron founder, for his invention of a machine whereby an additional power will be given in working ships' windlasses and capstans. 21st June. Six months.

ELASTIC CUSHIONS, &c.—To Samuel Pratt, of New Bond Street, camp equipage maker, for his invention of certain improvements on elastic beds, cushions, seats, pads, and other articles of that kind. 25th June. Six months.

NATIONAL REPOSITORY.

The catalogue of the articles exhibited at this establishment and the consequent arrangement of the subjects not being yet completed, we pursue the course adopted in our last number, of publishing the descriptions according to the order of our notes; and in the next impression, we purpose introducing all that may remain requiring engraved illustrations, with a brief account of every article in a condensed and methodical form, the three numbers (which constitute a monthly "part,") making a complete illustrated catalogue of this interesting though first annual exhibition of the products of our national talents and industry. The second exhibition, which will open in May next, we feel confident will, in extent, variety, and importance, at least treble the present; a lively interest being not only taken in it by the King, but, apparently, by the Cabinet Ministers also, and some of the most influential of the nobility. On Tuesday last we observed, among other visitors, the Right Hon. R. Peel, Secretary of State, Lord Goderich, Lord Farnborough, Mr. Horace Twiss, and several other men of distinction, whose patronage cannot fail to confer prosperity on the Institution.



NEW PATENT METHOD OF PROPELLING STEAM VESSELS CANAL BOATS, &c.

By Mr. J. L. Stevens, Plymouth.

Room R.

This invention is an improved method of applying power in propelling vessels, consisting in a series of paddles attached to a three-throw crank, to which a peculiar motion is given by radius and guiding rods; and it may be used as a substitute for undershot water wheels.

The figure represents a side elevation of the machinery as it appears in a paddle box, fixed to the side of a steam vessel, from which it occupies the same space as would be required by a common wheel of proportionate size; *a* is the centre of the axis of the crank *c c c*; and *b* is one of its bearings, supported on the side frame of the paddle box; *d d* (represented by two dotted horizontal lines) is one of the longitudinal beams which support the other bearings of the said axis; and at the extremities of *d d* are transverse beams to support them. In the paddle box provision is made for the occasional rise of the rods *g* and *f*, if it is not thought desirable to carry the paddle box above them; *e e e* are three sets of paddles, each set being carried by a division of the triple crank, which revolves between, and has its bearings upon parallel bars; the paddles are directed in their appropriate motion by means of the guide rods *f f f*, and the radius rods *g g g*, the latter of which work on a fixed beam or centre at *h*; *i i i* are arched spreaders to keep the paddles steady and firm; the paddles are marked *r*, and are fixed to vertical bars in the ordinary way; the upper ends of the bars being inserted in sockets cast in the paddle carriage.

By this arrangement one set, or an equivalent section of two sets of paddles is always acting in the water.

We have not thought it necessary, and our time would hardly allow it, to give an engraved *plan* of this machinery; as it may readily be comprehended that each throw of the crank revolves between two parallel bars, with its bearings upon them, and carrying with them a set of paddles. There are thus four bearings, the innermost of which is fixed to the vessel's side, and the outer one on the frame of the paddle box. The circle of motion described by the triple crank being equally divided (120° apart) between each throw, they balance each other on their general axis.

The inventor does not confine himself to this precise arrangement, as it may be deemed desirable to *lessen* the *number* of paddles on each set, give them *greater depth*, and *increase* their *stroke in the water* by shortening the guiding bars *f*; by which the *weight* and *expence* of the machinery would be *greatly reduced*.

Among the advantages presumed to be obtained by this very ingenious invention over the common wheel, the following are the most prominent.

The inventor's paddles work in a vertical position, due allowance being made for the impetus of the vessel, and thereby *save* the

power that is now consumed by the *descending* and *ascending* paddles on the common wheel.

From the peculiarity of their motion, describing in the water a *segment of an ellipse*, and not that of a *circle*, his paddles may be considerably deepened, and the *length of their stroke increased*, so that, occupying an equal space from the vessel's side as the paddles on the common wheel, their application of power is *greater*, and in a *much better direction*, avoiding much of the unpleasant vibration, and consequent wear and tear in the vessel and engines; and also the *back water*, which is dangerous to boats, and has hitherto been the chief obstacle to the introduction of steam vessels upon canals.

The patentee also calculates upon a great reduction of friction, and consequent durability and comparative cheapness; greater simplicity of construction, admitting of repair, unshipping, and replacing at sea, besides admitting of the paddles being kept clear of the water when using her sails only; the machinery being easily taken to pieces, and packed in a small space, additional sets may be conveniently taken on long voyages; an accident occurring to one set (on either side) it may be disengaged, and the others worked until it is made ready for use.

That Captain Ross, R. N., author of a work recently published on Steam Navigation, entertains a favourable opinion of this invention will appear by the following extract from a letter addressed to the patentee by that scientific navigator.—

"I have no hesitation in declaring that it appears to possess very considerable superiority over all the methods which have hitherto been adopted. In theory it is perfectly accordant with philosophical and mathematical laws, and I have no doubt that in practice it will be found no less consistent."

"PATENT STOVE,"

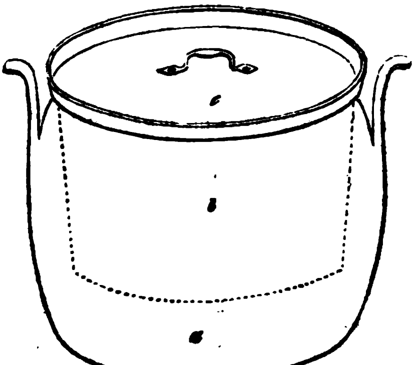
By Mr. Robert Vazie, of No. 2, York Square, Regent's Park.

Room B.

This we know to be a *patent*; but why it is called a *stove* we do not know: a carpenter would call it *a glue-pot*; a chemist would denominate it *a water bath*; either of these latter terms would be intelligible and proper, for it is, strictly speaking, both; but to call that a stove, which is to be heated by placing it on a stove, seems to us, to say the least, rather whimsical. Notwithstanding we quarrel with the name, we like the thing exceedingly, agreeing with the patentee entirely, that the process of cooking by it is one of the best and most economical that can well be imagined, and well adapted (as stated in the specification of the patent) to persons of "*narrowed domicility*."

In the printed prospectus accompanying this new patent *stove*, Mr. Vazie enters into an elaborate dissertation on the usual modes of preparing aliment. He explains in good set terms "the original mode" of boiling a leg of mutton, which he fearlessly asserts "con-

tinues to a very large extent!" and he further assures us upon his word as a christian, that "the length of this process differs from two to three hours, according to the size of the joint!" Having explained this and other equally secret processes of the culinary art, and exposed the injurious effects of the existing practice, he proceeds to describe his stove (of which we annex a cut in outline) for remedying the evil.



"There is formed," says Mr. Vazie, "a boiler of iron or other metal of any required form or size, in which there is placed a vessel or stove of silver plate, or tin, suspended in such a manner as to leave room for the extra steam generated in the boiler to pass into the upper chamber, or space betwixt the cover of the boiler and the cover of the stove. The process is performed by placing on the fire the boiler containing as much clear water as will rise to about one third part of its height; the stove is then inserted, into which there is put the required quantity of meat cut in slices, with vegetables, rice, onions, seasonings, and as much cold water as will cover those articles. The stove and boiler are then closed, and the operation commences. In the course of half an hour the water in the exterior vessel will boil, and speedily afterwards the stove will acquire the due heat for preparing animal food, *which it never exceeds. This is the desideratum which the faculty have, with great honour to themselves, frequently attempted to obtain, but heretofore without success.** The scum must be removed as it arises. At the expiration of an hour and a half the process will be completed if the heat in the boiler has been properly supported."

The patentee next explains how to make a truly aldermanic "English Stew," he then observes that "joints of meat, fowls, fish, potatoes, or other vegetables, require to be covered with water during the process; steaks may be dressed in butter or other oily substance,

* The scientific editors of the London Journal of Arts, state in their last number, that they feel it their "duty to call public attention to this *very unassuming*, but useful piece of culinary apparatus."

and confectionary with sugar. When the operation is performed in an oven, there will be required a cover on the stove, but none on the boiler."

The advantages resulting from this mode of cooking are, according to Mr. Vazie's account, so numerous, that we must be excused, for want of space, from inserting more than the following:

"By this process there is a saving of twenty-five per cent. in the consumption of animal food; but even that saving is of small import compared with the invigorating and healthful effect the human frame derives from a full supply of the juice of animals produced in a state of great perfection."

DOMESTIC TELEGRAPH,

By Mr. Marriott, of Fleet Street.

Room O.

This is an apparatus intended to prevent trouble in calling for certain articles in a dwelling-house, and to dispense with one half of the journies of the servants in answering the bell. It consists of two circular indexes or dials, equally divided into a given number of parts, and marked on these divisions with the names of such things or necessaries as are generally wanted in a house—such as dinner, tea, supper, boots, chambermaid, carriage, horse, &c. These indexes are fac similes of each other, and are provided with hands, the axles of which pass through pullies of equal diameter. A wire or chain extends from the pulley of one of them, fixed in the sitting room, to another fixed in the kitchen or servants' hall. The pulley of the latter contains a spring, and that of the former a ratchet and catch, so that if the hand of the sitting room index be turned, it also turns that of the servants' room an equal portion of a revolution, and thereby points to the same word. The pull is lifted off the ratchet after it is used, by touching a pin, when the spring in the other pulley draws the chain or wire round it, and so returns both the hands to their original place at Zero. The attention of the servant is called to the index by ringing a bell.

This little machine appears well calculated to reduce, in a limited degree, some of the evils at present entailed on a family in a large house, namely, the eternal annoyance and slamming of doors in giving orders to servants; and advances us one step further in the "march of intellect" to the glorious era when we shall have all our present doings performed by machinery, thereby removing the original curse from us, "By the sweat of thy brow," &c. We only now need the servants themselves to be machines, and we shall then have reached the desired summit of perfection. How delightful it will be when the present host of servants are represented by the engineer as the leader, and the under servants of wheel work in liveries of cast iron, turned up with brass—when a lady, instead of wasting her strength in giving orders, which are no sooner given than forgotten, but touches a spring, and forthwith her steam attendant fetches out her steam coach, and she is carried in her steam chair into its interior.

PORTABLE HIGH PRESSURE ENGINE,

By Mr. Partington.

Room R.

This is a handsome model of a steam engine, (exhibiting no novelty in its construction) which is stated to be 1¼ or 2 horses' power. It is to be regretted that so vague and indeterminate a mode of estimating the power of steam was ever adopted as the term "horse-power;" it conveys no idea of the force. A certain calculation was once made by Mr. Watt as to the average labour performed by horses, but his calculation differed from his contemporaries as 40 is to 27, or nearly double; and as both the amounts have their respective advocates, the term (before an indefinite one) became still more indeterminate, because, had the horse-power been merely calculated from the average performance of horses, we should have at all times the means of coming near the truth; but now engineers may adopt which of these amounts they think proper,—they have good authority for either.

We are led into these remarks by this model being called of 2 horses' power, because we should have conceived from its size that its force would be better estimated by saying men's power than horses' power. The modern improvement, or assumed improvement, however, of using enormously high-pressure, and even *red-hot* steam, seems to give us a right to call our engines what power we please, inasmuch as steam of 5 or 5000 lbs. may be applied to the same piston; and, therefore, the same engine may be of 1 or 1000 horses' power at the will of the engineer. If Mr. Perkins's boiler has succeeded, this is, undoubtedly, a 2-horse engine.

A GLASS BUTTER CHURN,

By Pellatt & Green, of St Paul's Church Yard.

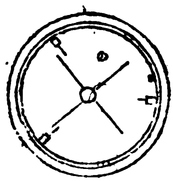
Room L.

It is well known that cream is converted into butter, or that the oily is separated from the other parts of the milk, and solidified by agitation: and it will be easily conceived that the agitation may be produced in a variety of ways; hence, the almost innumerable modifications of churns; but we have seen none more convenient and effective in its operations than the one represented by the annexed engravings, where fig. 1 shows a section, and fig. 2 a plan of the churn.

a represents the axis placed vertically in a glass cylinder, and furnished with four leaves *b b*, placed at right angles to each other (as seen in fig. 2,) and notched in the edges, and also perforated, (as seen in fig. 1.) To the interior of the cylinder are fixed three leaves *c c*, at equal distances from each other, and also notched on the edges so as to receive the projecting points of the leaves attached to the axis, and nearly fit them; at the same time allowing the moveable leaves to pass freely when the axis is turned round.

Fig. 1.

Fig. 2.



The agitation is produced by a rapid rotation of the axis, with its leaves or fans, which is effected by means of the bevil wheels *d* and *e* put in motion by the handle *f*.

This is an elegant little table churn, and shows the nature of making butter in a very interesting manner.

ELLIOTT'S AIR PUMP.

Room R.

This is a beautiful specimen of workmanship. The principal variation from the common air-pump consists in its being worked by a crank movement so that the motion of the handle is rotary instead of vibrating. This, however, is not new, as rotary air-pumps, though not so common, have been in use for a number of years. There is, however, *we believe*, some novelty in the mode of getting the parallel motion of the piston and rod, by a cross head and guides, which, though old as a motion for steam engines, yet seems to be new in its application to an air-pump. It is a very powerful and well-constructed instrument.

PATENT LIFE PRESERVER,

For the Prevention of Accidents arising from the Running Away of Horses attached to Carriages,—By Lieut. Cook, R.N. of 127, Long Acre.

Room R.

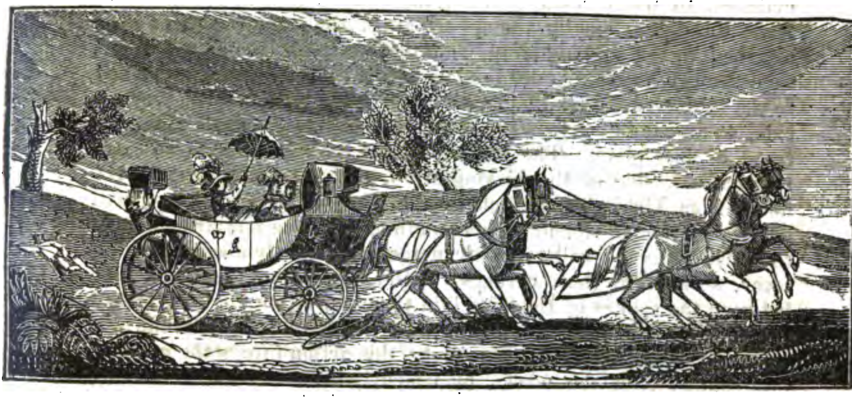
This is a very complete and efficient invention, inasmuch as it does not depend upon the power of the driver to check the career of the horses, but the power of the horses themselves is at the pleasure of the driver rendered subservient to counteract their own efforts. The

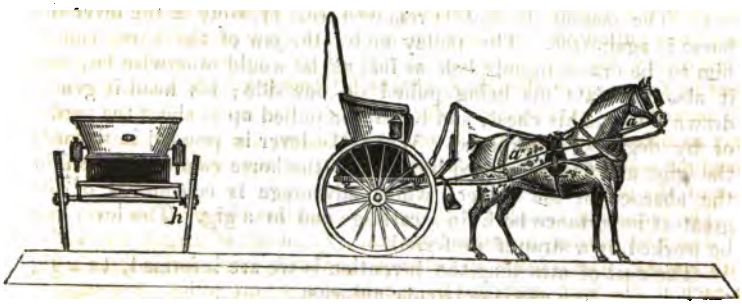
restraint is so irresistible that a lady, or a child, inside of a carriage, are enabled by it to stop with ease, four spirited horses.

The preserver consists of a neat *catgut rein*, covered with leather, running up between the horses, with four branch reins leading from it to the bit of each, and an apparatus enclosed in a brass box which is attached to the axletree close by one of the hind wheels. This box contains a cylinder, to which the *rein* is connected; and if the horses should at any time overpower the coachman, or should the reins break, or a buckle-tongue slip, he can, in an instant, by putting his hand to a ring' by his side, cause the wheel in its natural revolution to act on the cylinder, which shortens in the rein in so gradual a manner as almost to be imperceptible, but with a power that would resist the most impetuous horses, while the effect is produced without causing them to feel the least restless or uneasy, and without exertion on the part of the driver who is quite at liberty to guide the horses if necessary, and who, after pulling them up thus gently to any degree he pleases, can instantaneously free them from the restraint. The cylinder is so contrived as to wind up no more than is necessary to pull in the horses, when it ceases to act of itself; and if they were to start off in the absence of the coachman from his box, from which he must be absent several times in a journey, they would be as gradually and regularly pulled in as if he were on his seat, merely by his hooking the ring over the stud before he leaves it. In the event of the traces, the pole hook, or a bar breaking, the rein prevents the horses from rushing forward, by which many drivers have been pulled off: and any one horse can be kept under restraint, if necessary, to the exclusion of the others. Not a minute longer need be taken up in changing, at which times it affords a considerable security to passengers. The invention has been well tried, not only as fitted to a stage coach and to carriages, but also to one horse phaetons and gigs, which necessarily require a very different application of the power.

The following sketches will serve to elucidate the plan:—

The first shows the patent life rein, *ff*, made of catgut, covered with leather, which leads up between the four horses, and is attached to each at the four branches by means of a spring billet; the small angular parts shown, are supposed to be always kept on the bits of stage coach horses, with a ring at each angle, to which the spring billets are hooked. This life rein *f f*, passes through a roller at *g*, and leads to a cylinder, within the brass box, which is shown by the black speck at *e*; this box is bolted to the axletree-bed close by the inside of the naye of the wheel. The catgut cords or straps, *b*, *c*, (the former leading into the carriage, the latter to the coachman,) are attached to a small lever, connected with the cylinder in the box *e*; this lever, when raised, causes the wheel to act on the cylinder, which slowly winds up the life rein, until the strain is off the traces, and the pole-pieces become tight, when the cylinder ceases to act. The other cord, *d*, is attached to a spring in the box, *e*, which, when pulled, lets out the rein, *ff*, to its original length. The handle to cord *c*, being hooked up by the coachman on leaving his box, the horses are prevented from running away in his absence.





The next represents a lady in the act of pulling in, by means of the cord *b*, the horses which were running away, in consequence of the coachman having been thrown from his seat.

The third gives two views of a stanhope, fitted with the life preserver. The black part at *h*, shows the position of a circular brass box, which is fitted around the part of the axletree contained between the spring and the nave of the wheel; within this box is a cylinder, to which a catgut life rein, *a a*, is attached: this rein leads through an eye by the upper part of the step, through a ring attached to the kicking-strap, and that on the hames of the collar, then through a pulley under the jaw of the horse, (which is affixed to the snaffle-part of the bit,) and down in the same way on the near side, to an eye in a regulating plate, attached to the shaft under the tread or foot-plate. The leading of the life rein through an extra ring on each side of the kicking-strap, will effectually prevent the horse from kicking, inasmuch as the force of every attempt will bring an action so violent on his mouth as to cause him immediately to desist; this is a collateral advantage but recently discovered. A lever, seen at *h*, (but, perhaps, better shown by the black line between the spokes of the wheel in the other figure,) is so attached to the axletree inside the spring, that the driver can conveniently press in the upper part with his foot; this action brings the cylinder into contact with the wheel, by which, when the horse is running away it is set in motion, and as it revolves it draws in the life rein, *a a*. The instant the foot is removed from pressing in the lever the horse is again free. The pulley under the jaw of the horse causes him to be drawn in only half as fast as he would otherwise be, and it also prevents his being pulled on one side; his head is gently drawn towards his chest, and he can be pulled up in about ten yards, or by degrees, at pleasure. When the lever is pressed in towards the gig, and there secured by a strap, the horse cannot start off in the absence of the driver, which advantage is considered of the greatest importance both in a carriage and in a gig. The lever can be worked by a strap if preferred.

The cost of attaching the invention is we are informed, to a gig ten guineas, to a carriage twenty guineas.

PATENT RAIN-GUAGE,

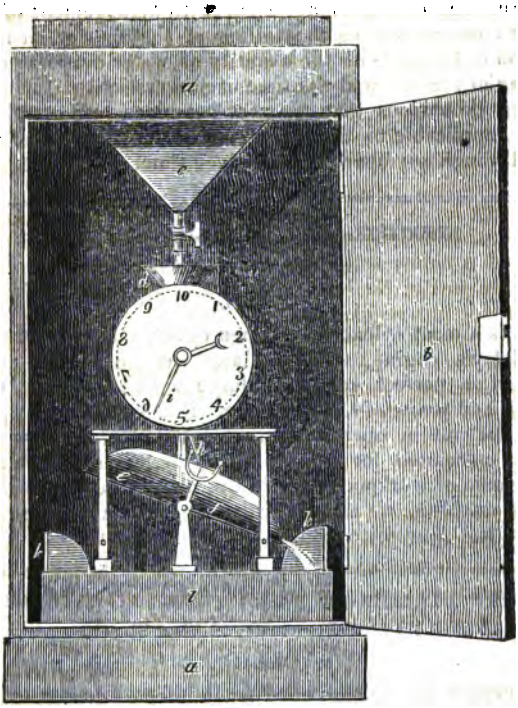
By Mr. S. Crossley, *of the City Road.*—Constructed by F. C. Watkins.

Room R.

This is a very elegant and useful application of Mr. Crossley's patent liquid meter to register the quantity of rain falling during any assigned time.

The construction and action of this apparatus will be best understood by inspecting the following drawing.

The principal parts of this machine, which is enclosed in a small box *a a* and *b*, and a small tin vessel or tumbler *e f*, which is divided into two equal parts by a vertical partition, where it is supported by



pivots on the upright stem *l*. The pivots are placed below the centre of gravity of the tumbler so that when it is tilted, (as represented in the drawing) it will remain in that position till the upper half receives such a quantity of water as will over balance it, when the end *e* will be depressed by the weight of the water and emptied; the end *f*, will in consequence be elevated and brought under the spout to receive the water, until it becomes sufficiently loaded to preponderate, when it will again take the position represented in the figure. Attached to this tumbler is a forked projection, which at every change of position acts on a lever at *h*, and thus communicates motion to a train of wheels which by the index and the dial face *i*, is made to register the number of times the divisions of the tumbler have been filled.

The rain is received and conveyed into the tumbler by the hopper shaped vessel *c c*, the mouth of which must be made of an area, having such a relation to the other parts that the index will point out the number of inches of rain falling on that extent of surface; or, in other words, how deep the water would have become, had it remained on the surface of the earth, during a single shower, a day, a week, a month; or even a year, if required: and this, too, without any attention or care being bestowed on it; for the apparatus is so simple

in construction, that it is not subject to derangement of its parts, and as it registers during the falling of the shower, it requires no estimation to be made of the quantity of water evaporated between the falling of the rain and the time of observation.

It will be obvious that this very ingenious and useful apparatus is equally applicable to the registering of the quantity of any liquid passing through any aperture in a given time.

MAUDSLAY'S STEAM ENGINE,

By Mr. Galloway.

Room L.

This is a most splendid specimen of art. It is a working model of Maudslay's engine, with its latest improvements, and is, we understand, a perfect copy of a large working engine, containing every bolt and screw of the large one. It is worked by a spirit lamp, and can be put in operation in a few minutes, and is, therefore, admirably calculated for the boudoir or the lecturer's table. Either as a specimen of workmanship merely, or as a perfect model of this wonderful machine, we can safely say that we have yet seen nothing to surpass it. The price, too, is extremely moderate...

"PATENT" MACHINE FOR HUSKING INDIAN CORN.

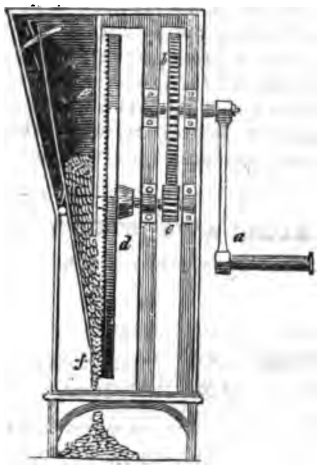
By Mr. Marriott, of Fleet Street.

Room C.

The word "Patent" we have put in italics, because we somehow doubt the fact of its being such, although so inscribed in large iron letters upon the machine. If we are wrong in our suspicions, we are open to correction by the patentee; all we can say at present to the point is, that such machines were commonly used in America for the purpose of shelling Indian corn, long before Mr. Marriott assumed to himself the exclusive manufacture. The machine is in itself a very simple, compact, and effective contrivance; we are, therefore, the more anxious that no *unfair* monopoly in it shall exist. It is a very common practice, and a very pernicious one in its consequences, to inscribe the word *patent* upon articles, which have never been patented, or which have *not the slightest originality* in them, and upon others in which *the term of patent-right has long expired:* to which of these classes the present contrivance belongs, or whether it belongs to either, we do not know, but desire to be informed. Little is known of these machines in this country, as Indian corn or maize does not ripen in our climate, and is grown in our gardens merely as an ornamental plant.

The annexed engraving represents a side elevation of the machine, with the hopper in section.

a is a crank handle or winch, which being turned, gives motion to a spur wheel *b*, and thereby causes a rapid revolution to a pinion *c*, on the shaft of which is fixed a large circular cast-iron plate *d*;



(seen, like the wheels, edgeways) the operating flat surface of which is studded all over with very numerous cast-iron knobs or teeth: *e* is the hopper of the figure, of a narrow inverted quadrangular pyramid; it has one of its sides moveable and capable of a very simple adjustment, by turning as a lever upon a fulcrum at *g*, by which movement the aperture of discharge *f*, is enlarged or contracted, and it should be so regulated as only to admit of the central stalks of the cobs of Indian corn to pass, which differ in size according to the fertility of the soil, the climate and agricultural treatment of the plant. At *h* there is a curved slot mortice through the side of the hopper, through which the stem of a thumb-screw passes from the outside into the moveable plate, which is confined at pleasure in the required position by a half turn of the screw.

These machines, we are informed by an American farmer, are usually worked by one person turning the winch *a*, which gives very rapid revolutions to the large toothed plate *d*, while a boy drops one by one the cobs of Indian corn into the hopper, which causes each cob successively to spin round upon its axis or stalk with great velocity, rubbing or knocking out the grain in its progress. The effectiveness of this process may be judged of when we inform our readers that a single turn of the winch completely husks or shells a large cob of maize.

SPECIMENS OF PAINTING IN WOOL.

Room L.

These are most exquisite specimens of this novel and pleasing art. They are constructed by placing wool, dyed in different colours, in such a manner against a glass as to give all the effect at a certain distance of a beautiful picture. One of them is a landscape,

and has about it a sweetness of tone and delicacy of colouring which shews much taste in the fair artist. The other, a figure of a little girl, is also an extremely pleasing and expressive picture, the countenance exhibiting a beam of intelligence which we could not possibly have expected to have been produced from such materials.

We are sorry to find, however, that a still more curious production of the same artist has been removed; we allude to a bas-relief model in wool of a lady reading, in which not only all the folds of her dress, but even the ornaments and something of the figure of the lace were accurately depicted. The countenance exhibited a thoughtful and studious expression, which was, on the whole, truly wonderful.

APPARATUS FOR ASCERTAINING THE FORCE OF CONCUSSION,

By Mr. Marriott, of Fleet Street.

Room R.

This is a useful machine badly placed; it is best adapted, we presume, for ascertaining how forcibly a blow may be struck by the fist, and should therefore be placed in an horizontal, and not *as it is*, in a vertical position. It consists (we should first say) of a brass tube sliding on a cylinder fitting its interior. Between the top of the cylinder and of the tube is a spiral spring, which forces up the tube to the extent which it is allowed to rise. A groove is cut vertically in the tube, through which a pin projects from the interior cylinder. This pin acts upon an indicator, which moves stiffly in the groove, so that on the tube being forced down the indicator is prevented from going down by the pin, and on the rising of the tube it also rises, and thereby it prevents the force which has been used by the index to press down the spring. The sides of the groove are divided to represent pounds on one side, and stones on the other. A cushion covers the top of the tube, in order to prevent the hand from being hurt in striking.

We have said that this machine is badly placed, but we think it is so in another respect. We think the inventor should send it to the Fives Court; by so doing, we conceive he would not only get several purchasers, but confer a benefit on the public. What an admirable thing would it be if we could record the force of arm which the successive pugilistic heroes have possessed. How happy would it have been could we have prevented the present war, not of words merely, which sometimes exists among the worthies of the P. R. as to the strength of the Bittons and Belchers compared to that of the Cribbs, Springs, Carters, and Sampsons. For, then, instead of saying that Belcher was the better man because he won more battles, we should have it in Cribb's chronology, "June 20, 1793, Belcher's blow, 250."—May 16, 1825, Spring ditto, 240.—And we shall then farther see how beautifully the scientific whirl of the present day has increased the force of the boxers. How forcible a blow

little Dick Curtis, by throwing his active body into it, can strike compared to much heavier men. Thus, by recording the weight of the man as well as the weight of the blow, we should see how much of this *fly-wheel power* he possessed. If "honest Tom" (now he is gouty) should have taken to study, and reads our Register, we would strongly recommend him to purchase one of these machines without delay, and institute a book of record immediately for such as choose to put their fists upon his cushion.

TAIT'S MUSICAL GLASSES.

Room L.

This is an important improvement on the old plan of constructing musical glasses, dispensing with the tedious process of tuning them by water, and destroying the discordant vibration to which the old method was liable even in the hands of experienced performers. The improvement in the present instance consists in the glasses being tuned by grinding them, so that they are at all times in perfect order for the performer, and not liable to be deranged by the evaporation of the water.

But it appears that there is another advantage attendant on this mode of tuning. Water has the effect of increasing, in a sensible degree, the vibration complained of. This must be well known to every person who has observed a musical glass when in use, and the beautiful and symmetrical figures formed on the surface of the water by this defect, have been the subject of curious investigation.

The tops of these glasses are painted, and this also tends to aid in removing the vibration; and, judging by the sweet tones of this specimen, we are of opinion that the instrument may become generally adopted. It is elegantly fitted up in a mahogany frame, and forms a pretty piece of furniture.

ARTIFICIAL SPRING,

By Mr. Thompson.

Room C.

This is a process of quick filtration, which, at the present moment, is much wanted. The public, in general, have but little idea of the filth they are daily swallowing in the water which they drink. It appears by the examination of several of the parties before the committee of the House of Commons, recently appointed to inquire into the state of the water in the metropolis, that filth of all sorts is to be found at the bottom of their cisterns. The artificial spring here exhibited is calculated, however, to enable us to dispense with such frequent use of this "villainous compound."

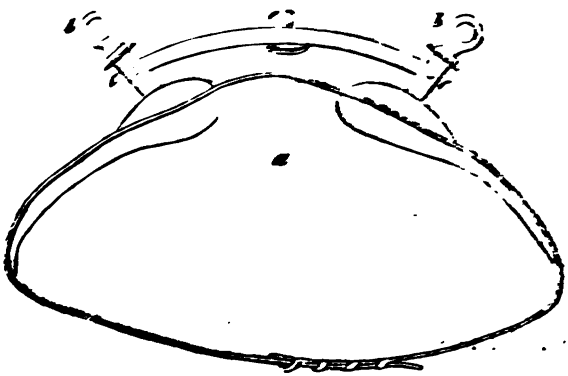
The apparatus consists of two stone-ware vessels, the upper one being filled with the impure water, and the lower one with the sub-

stance by which the water is filtered. A stop-cock admits the water into the lower vessel, where it is received on a flat surface cemented to the vessel a few inches below the top. A sponge placed over a hole in this flat surface prevents the grosser impurities from passing into the interior of the vessel; the water then passes through a substance kept secret by the inventor, and is discharged by another cock as clear as crystal. One of these filtering vessels will purify, it is said, forty gallons per day.

PATENT IMPROVED HARNESS PADS,

For Mr. I. Lukens, (late of Philadelphia, but now) of London,— Manufactured by Cuff, of Pall-Mall East.

These pads are worn precisely as the common pads, and are adapted to fit any horse's back, as will be best understood by reference to the annexed sketch.



a is the pad, the two sides of which are connected by a flexible strap, and also by a curved inflexible bar, which is attached to the terrets *b b*, by joints at *c c*. In the middle of the curved bar is fixed (what is termed in the common pad) the bolt hook. The joints at *c c*, it will be perceived, allow of the pads being moved nearer to or farther from the centre of the horse's back. These pads are, it is said, cooler, lighter, and sit pleasanter to a horse's back, than those of the usual kind.

TO OUR READERS AND CORRESPONDENTS.

Mr. Hitch's patent is intended for early insertion.

R. R. will meet with the information he seeks in Nicholson's Operative Mechanic.

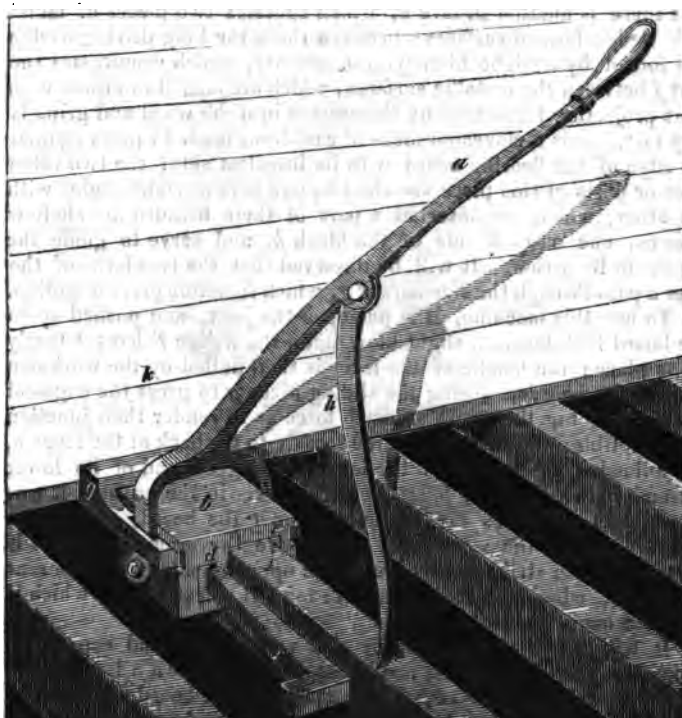
If Mr. Langton will point out the error it will be rectified.

Brittannicus is intended for early insertion.

NATIONAL REPOSITORY.

We now complete the task of giving "a brief account of every article" in this establishment, and thus redeem the *first* part of our pledge; with respect to the *second*, that of adding "detailed descriptions, with engraved illustrations of such machines and models as from their novelty, utility, or ingenious construction, may be deserving of it," we have virtually fulfilled that also; for it will appear that we have given no less than 32 engravings, and have condensed the descriptions as much as possible. Those few subjects which will require engravings and a more enlarged examination than we have given them in the subjoined *classified* catalogue, will be inserted in our early subsequent numbers.

The first subject which we here introduce to our readers, affords amongst others a most satisfactory proof of the advantages of the above Institution to the public, and to the individual exhibitors; the inventor of the machine next described having received a considerable order for them from Government, in consequence of its exhibition in the Repository.



NEW LEVER CRAMP, FOR LAYING FLOORS.

NEW LEVER CRAMP FOR LAYING FLOORS,

By Mr. ANDREW SMITH, of No. 2, Palace Street, Pimlico.

By the usual method of uniting the edges of flooring boards together, so as to make the joints very tight and close, a considerable degree of trouble, labour, and force, is often necessary. Mr. Smith's machine is designed to obviate these inconveniences, which it does in the speediest, most effectual, and easiest manner possible.

Our engraving represents a perspective view of the cramp, and the mode of applying it to a floor, by which its construction and use are both made apparent. *a* is a lever of the second class, of about 2 ft. 6 in. long, with a handle at the upper end, and forked at the lower so as to be attached to two of the opposite sides of a block of cast-iron *b*, by bolts at *c*. The block *b* is about 6 inches square and 3 inches deep, with a large groove, capable of being increased or diminished in its depth for the reception of joists of different sizes. For this purpose it has on one side a shifting loose cleat or thick plate *e*, kept in its place by stout pins; and on the other side of the joist there is another groove *d*, which contains two pieces of metal with wedge-formed surfaces; between these the long driving wedge *f* is forced by a slight blow with a hammer, which compresses the joist *j* between the metallic surfaces, which are jagged or armed with short projecting teeth that fix themselves into the wood and gripe it very fast. *g* is a moveable piece of cast-iron, made to press against the edge of the flooring board with its broadest side; the two other sides or parts of this piece are stout square bars at right angles with the other, which are inserted a part of their breadth in shallow grooves, one on each side of the block *b*, and serve to guide the former in its action. It will be observed that the two forks of the lever *a* pass through the side bars of *g*, which therefore gives it motion.

To use this machine, it is put upon the joist, and pushed up to the board laid down, a slight blow upon the wedge *f* fixes it firmly to its place; the handle of the lever is then pulled by the workman towards the boards, causing the sliding piece *g* to press the edges of the boards *k* together, with so much force as to render their junction imperceptible: the stay *h* is jointed loosely to the back of the lever *a*, and following the motion of the lever, the jagged end of its lower extremity sticks into the joist, holds the lever in the position it was drawn, and preserves the pressure against the board, while it is nailed down by the workman. To remove the cramp, all that is necessary, is to strike the wedge on the opposite side, which loosens the whole, when it is drawn back to take the next board, which is operated upon in a similar manner.

It will be perceived that by this very simple and convenient apparatus, a single workman may, unassisted, lay down a large floor; as when the lever is pulled, the cramp holds the board immoveably, whilst it is being nailed down. It is unnecessary for us to enter into a detail of the defects of the present system, as it concerns the builder only, who will know how to appreciate this valuable invention for facilitating and perfecting his work.

PATENT REFRIGERATORS AND CONDENSERS,

By R. Wheeler, of High Wycomb, Bucks.

Room R.

In the two models of this apparatus exhibited at the repository, a distinction is made between the above terms, the one being called "*the convoluted refrigerator,*" and the other "*the Archimedes condenser,*" although they are alike applicable to both purposes. The one we understand, is intended for cooling worts, the other for condensing spirituous vapour.

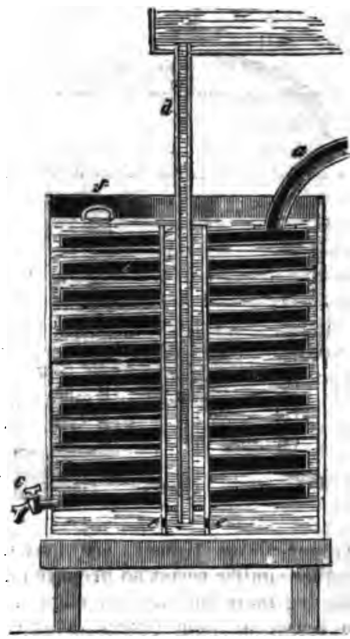
The convoluted refrigerator we shall first describe, with reference to the annexed cut, which is nearly a representation of the mode' exhibited.

A series of copper-plates tinned, are first soldered together lengthwise, and another similar series so prepared are connected with the former, by soldering their longitudinal edges together, in such a manner as to leave between them (except at the edges) a space of from an eighth to a quarter of an inch; they are afterwards convoluted into the form represented in the engraving, and placed in a tub or cylindrical vessel, within the narrow continuous chamber thus formed the wort is made to flow from a copper or reservoir, while the water or other cooling fluid is made to flow in a contrary direction, by

which arrangement the two fluids will nearly exchange their temperature, the water becoming heated, and the wort cooled.

a represents the service pipe and cock, which brings on the water from a cistern above; it enters at the bottom of the vessel in the centre of the convolute, from thence passing round the coils, it abstracts the heat from the wort contained in the flat chambers, and passes off in a heated state at the upper part of the pipe *b*, and descends into the trough *c*. The wort is received at *d*, the lower part of which pipe has an opening into the narrow convoluted chamber, the wort circulating through all these coils, arrives at the centre, from whence it descends and passes out by a pipe *f* in a cool state; at *g* there is a small curved pipe to allow the air in the wort chambers to escape; at *h* is a pipe and cock for discharging the water in the tub whenever needful.

"The Archimedes condenser" is so called, we presume, from being in its figure something like the water screw of that philosopher; but it differs so essentially in its nature and object to the invention alluded to, that the name seems to have been rather inaptly selected. The subjoined cut represents a vertical section of the apparatus.



a is the pipe leading from the neck of the still, through which the vapours enter into the flat chambers *b b* (represented black.) These chambers, owing to the sectional view, appear to be disconnected, but they are wound spirally round a central tube, and termi-

nate at the cock *c*, where the condensed products pass off. *d* is a pipe leading from a reservoir of cold water to the bottom of the central tube, where it passes through holes represented at *e e* underneath the vapour chambers, and can only ascend in the vessel by passing successively through every coil, as each turn of the spiral is connected by the edge of one of its plates to the side of the containing vessel. The water thus heated in its progress flows out at the aperture *f* into a trough or pipe.

By this very elegant arrangement, it will be noticed that the hot vapour or fluid is constantly descending spirally an inclined plane, while the cold fluid is constantly ascending, almost in contact with the other, as they are only separated by a very thin plate, formed of the best conducting substance (copper). It will likewise be evident that two fluids, one cold and the other hot, may thus be made to exchange their temperatures. Thus, if cold water at 50° Fahrenheit be admitted at the bottom of the vessel, it will, when it arrives at the top, be nearly of the same temperature as the vapour or liquid (say 200°) which entered at the top, by having gradually abstracted the heat from the vapour or hot liquid in its progress. This being understood, it follows that the latter, having gradually parted with its heat in its descent, will become of the same, or nearly the same temperature at the termination of its course as the water, namely 50°; provided the liquids be admitted in their proper volumes, which is easily regulated by the cocks.

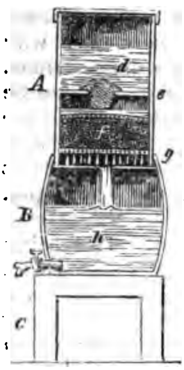
These are, undoubtedly, useful and well-arranged contrivances; at the same time we ought to state, in fairness to preceding inventors, that they contain but little novelty. Mr. Yandell took out a patent for some refrigeratories closely resembling these about two years before, and we then stated that Mr. Yandell had been anticipated many years previous. In short, with the view of extending the surfaces of the metal interposed between the hot and cold fluids as much as possible, almost every possible form, position, and modification, of very narrow chambers formed between the flat surfaces of plates, and of causing the fluids to pass in opposite directions, have been tried and generally approved. Mr. Vallance, of Brighton, (the ingenious projector of travelling by vacuo,) proposed plates thus disposed, but gave the preference to numerous small pipes, in consequence of their exposing in his opinion, a greater extent of conducting surface, in proportion to the quantity of fluid, than plates. And Mr. Bundy *subsequently* took out a patent for the same thing, (i. e. small pipes, which see Register of Arts, vol. 1, p. 321, first series.) But there are many other points to be considered in estimating the value of the apparatus for the purpose, which would take more space to explain than we can spare, we shall therefore conclude by giving our entire approval of THE CONVOLUTED REFRIGERATOR, and THE ARCHIMIDES CONDENSER.

WATER FILTERER,

By Mr. William James, of Knightsbridge.

Room L.

This is an excellent and convenient form for a filtering apparatus, and may be considered as an improved modification of its predecessors of the same class.



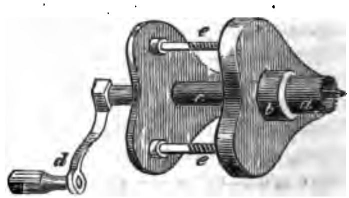
It consists of two vessels (A and B) of stone-ware, placed upon a strong stand C. The upper vessel, which is covered, receives the impure water in a chamber *d*, at the lower part of which there is a large aperture, stopped by a sponge *e*, which detains the grosser impurities: hence the water passes through a finely perforated earthenware plate into a layer, six inches deep of prepared charcoal, through which the water filters, and is further deprived of its impurities; it then passes through another perforated plate *g*, and is received at *h* into the separate vessel, which is a stone-ware cask; from this it is drawn off at pleasure in a highly transparent and brilliant state.

INSTRUMENT FOR REMOVING FRACTURED BONES,

By Mr. Cluly.

Room O.

This instrument, though not of a very novel description, is well deserving of notice, not only on account of its present application to surgery, but as being rendered capable under various simple modifications of performing several mechanical operations in a more expeditious and perfect manner than they are at present.



a represents a thin steel tube fixed in a brass collar *b*, which is made to revolve upon the axis *c*, by turning round the winch *d*. There are three screw supports *e e* to the upper and lower plates, which form the frame, and the distance of the plates from each other is adjustable by the screws *e e*. The end of the axis *c*, which passes through the steel tube, is formed into a pointed drill, and extends a little beyond it; the edge of the steel tube is serrated with fine sharp teeth, forming thereby a circular saw of a perfectly distinct description to the ordinary kind. The case which holds this instrument is provided with variously sized tubular saws, and drills, and likewise some screws, which we will now explain the use of, as we presume it to be.

In the case of a fractured skull, the scalp being removed from the part, a circular piece of the bone is cut out by means of one of the tubular saws; this circular piece is perforated in its centre by the drill, which guides the saw in its work; the saw is then removed from the frame, and a screw inserted in its place in the frame, which is screwed into the aperture made by the drill; the circular piece of bone is now easily removed, and access gained under the arch of the skull, when the splintered and detached pieces of bone are removed, and the depressed parts sometimes raised into their original positions. In this operation the utmost skill and anatomical knowledge are of course required, and it would be travelling out of our sphere to explain the matter more in detail.

Circular saws of this description have been recently applied on the large scale, under patented rights, for cutting out concentric cylinders from solid blocks of stone, and other substances.

IMPROVED TRANSPARENT WINDOW-BLINDS,

By Mr. W. B. Simpson, 84, Newman Street, Oxford Street.

Room L.

Specimens of these are exhibited in Rooms *L* and *R*, and on the staircase *O*; they are painted upon a thinner and more transparent medium than usual; they obscure very little (if any) light; and from their brilliancy of colour, are nearly equal to stained glass; in novelty of design, they are calculated to become a very ornamental as well as useful article of furniture. These productions have considerable merit, and are certainly the best things of the kind we have seen.

WELLES'S PATENT PERIPURIST,

Manufactured by Tozer & Son, 20, Henrietta Street, Covent Garden.

Room L.

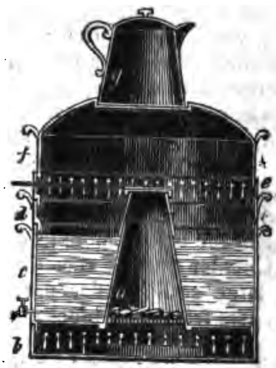
This is a portable cooking apparatus, and ingeniously designed for the purpose. It is made of tin plates, copper, or other metals, and is got up in an elegant, and sometimes an ornamental manner. The patentee states in his prospectus that "it boils water, prepares coffee and chocolate in a very superior manner, boils eggs, cooks a beef steak or a slice of ham, and all in less than ten minutes. For dinner it will prepare soup, steam vegetables, and cook fish, chops, or steaks at the same time; *and for all this, one farthing's worth of fuel is more than sufficient.*"

Fig. 1. is an external view, and fig. 2 is a vertical section.

a is a small cone of cast iron, having at the bottom a grating, on which is put the fuel, (charcoal,) broken into small pieces; below this is a small chamber *b*, perforated at its sides for the admission of air, and containing a small pan to receive the ashes, and also to light the charcoal by a piece of paper; the vessel *c* contains water, which

Fig. 1.

Fig. 2.



entirely surrounds the cone; the next vessel *e* above is intended to be used as a steamer; it has in its centre a frustrum of a cone, the lower edges of which descend below the bottom of the vessel, and fit upon the cone beneath, so as to carry up the flue to the chamber above, which has open perforated sides, whence the vapours produced by the combustion escape. On the top of the cone there is a valve for enlarging or diminishing the aperture, having a horizontal rod fixed to it, which passes to the outside of the vessel as shewn. The vessel over this *f* is, we suppose, a stew pan, or something of the kind; it is heated by the hot air and direct influence of the fire: above this pan is inserted in a cavity of the cover, a small pot for warming small quantities of liquid. There are several other appendages or vessels for peculiar purposes, such as the boiling of eggs, &c., which fit one over another in a similar manner to those described.

The apparatus is proposed to be used on the breakfast or dining table, to be taken in a carriage, in a boat, or carried by pedestrians.

PATENT HORSE COLLARS,

By Mr. I. LUKEN, (late of Philadelphia, but now) of London,—Manufactured by CUFF, of Pall-Mall East.

Room L.

THE hame of the collar is in one piece, therefore not liable to collapse like the ordinary hames of collars do, by which the shoulders of horses frequently become wrung. The pads upon it are not fixed immoveably, but turn round the hames as upon an axis, by which means the pressure adapts itself to the motion of the horse, and materially reduces the friction upon the horses shoulders. From the elasticity of the hames it has a tendency to expand; and by the shifting of the pads, the same collar may be readily adjusted to fit any horse of the same class for which it was made.

A CLASSIFIED CATALOGUE OF ALL THE ARTICLES IN THE REPOSITORY,

With Remarks upon their Properties.

SPINNING, WEAVING, &c.

1 to 6. Specimens of spun and thrown silk.
7—10. Silk barege or grenadine, equal to the Lyonese.
10—13. Figured ducapes, gros-de-Naples, cerise, or full-rose ducape, gros satiné et Ombré, rivalling the French manufacture.
14. Variously-dyed silks, being examples of superior brilliancy of colours.
16. Superior British shawl crape handkerchief.
19—22. Four specimens of extraordinarily cheap spun-silk handkerchiefs.
23—24. British silk bandana handkerchiefs.
25—40. Nineteen specimens of beautiful shawls, of British manufacture, from various houses; of the Valencia, Cachmere, and other kinds; some superior to the oriental.
41—53. Twelve specimens of Virginia, crépe, and extra-chintz muslins.
54—56. Specimens of a new and improved manufacture of table covers, from Dumferline.
57. A warm cloak made of "York beaver," a new and handsome manufacture of woollen cloth.
58. Fine specimen of British lace of the Mecklenburg kind.
59—60. Specimens of new straw plait, and Tuscan plait.
61. Bonnet covered with a new manufacture of silk.
62. Patent diaphane parasol, by Crawford, covered with a peculiarly light transparent fabric of silk, which exhibits the ornamental design upon it through the interior lining, but is, nevertheless, impervious to the rays of the sun.

GLASS MANUFACTURE.

63—125. Beautiful specimens of ornamental glass ware, partly with the crystallo ceramic incrustations,—manufactured by Pellatt and Green.
139. Specimens of painted glass, vitrified colours, by Ward.
140. ——— of embossed and stained glass, by Hudson.

MODELS IN ARCHITECTURE & BUILDING.

132. A suspension bridge, sent in by C. F. Partington—*described by us, with engraving, page 202.*
143. A temple in ivory, by Holtzapffel and Co.; highly tasteful, and the workmanship executed with wonderful precision.
191. Design model for a church, by W. Bardwell. The edifice is arranged after the manner of the Church of the Holy Sepulchre, and the four ancient round ecclesiastical edifices in England. Mr. Bardwell states (and very justly) that in a church built upon this plan, the voice of a preacher would be distinctly audible to upwards of 2000 persons.

192. An elaborate model of that elegant structure, Coventry Cross, as it existed in 1539.
193. Model of St. Paul's Cathedral, by A. Neale.
194. Model of an improved truss, forming part of the roof of Finsbury Chapel, by W. Brooks.
195. Model of the Parthenon, in bronze.
196. Model of the Roman Catholic Chapel in Moorfields, by J. T. King, Esq.—This beautiful piece of workmanship represents most minutely the Roman Catholic Chapel in Moorfields, with all the decorations. The roof of the building is of glass, which, as it admits a powerful light, enables the spectator to examine every part of the interior of the structure. The elegant Corinthian pillars, and the rich entablature, divide into three compartments the panoramic view of the picture over the altar, in which upwards of 50 figures are embodied on the subject of the Crucifixion, with a distant view of Jerusalem and the surrounding country, are well represented.

Under the dome is represented a rich statuary marble altar, in the form of a sarcophagus, elevated upon several circular marble steps. On each side of the altar stands the figure of an angel supporting the altar table. The tabernacle which stands on the altar, resembles a temple of the Greek Ionic order, enriched with ornaments emblematical of the sacrament. The basement of the model is made to slide out like a drawer, forming a flat box covered also with glass, through which is seen the arrangements of the cemetery and various offices of the building. The small model of the Receptacle of the Sacred Host, erected annually on Maundy Thursday, on the left side of the altar for the consummation of the sacrifice of the mass on Good Friday following, belongs to this original model of the Catholic Chapel in Moorfields: its design is peculiarly chaste and attractive.
198. Perspective model of the Thames Tunnel.

MODELS OF MACHINERY.

128. Beautiful little model of a high pressure engine, by Kirby.
129. Ditto of a locomotive steam engine, by Mason Styles.
130. Sectional model in wood of Trevithick's locomotive steam engine, sent in by C. F. Partington.
131. Model of Lieut. Skene's patent steam boat paddle wheels, *fully described by us, with engravings, page* 195.
237. Model of Wheeler's patent refrigerator, *described by us, with an engraving, page* 227.
238. Model of Wheeler's patent condenser, *described by us, with an engraving, page* 228.
248. Models of machinery for sweeping chimneys, by J. Barwick, *see Register of Arts, present series, page* 94.
265. Model of a steam kitchen, by J. Benham.
276. Model of J. L. Stevens's patent steam boat paddle wheels, *described fully by us, with an engraving, page* 209.

Beautiful model of Maudslay's engine, by E. Galloway, ***described page*** **220.**

WORKING MACHINES, APPARATUS, & IMPLEMENTS,
(FULL SIZED.)

15. Loom *at work*, weaving variegated clouded ribbon. The weaver works with his feet three pair of treadles alternately, while he throws the shuttle with the same regularity as if he were part of the machine himself.
16. Loom *at work*, weaving brocaded ducape, with the use of the jacquard, on the Lyonese principle. This machine, though it presents nothing extraordinary to persons acquainted with weaving of the nature upon which it is employed, cannot fail to strike with surprise and delight all other visitors. Were there nothing else than this in the exhibition, it is alone worth the admission money to witness its curious, though noisy operations.
17. Loom *at work*, weaving grenadine.

The hours of working these looms in the gallery are from 9 till 1, and from 2 till 6 o'clock.

133. A gentleman's turning lathe, by Holtzapffel and Co. The admirers of *exquisitely true* workmanship may feast their eyes upon this machine for a good hour, and then find it difficult to leave off the examination. To give a proper description of it, with its numerous appendages, would take several pages, therefore we can only recommend our readers to inspect it for themselves. The apparatus comprises a great variety of chucks, and every implement for plain and ornamental turning, oval and eccentric turning, screw cutting, &c.
134. Portable smith's forge, by Holtzapffel and Co. This is the prettiest and most compact little forge we ever met with; we have taken a sketch, and shall shortly insert an engraving of it.
135. Joiners' tools in a birch-wood cabinet, improved arrangement, by Holtzapffel and Co.
136. Apparatus for compressing the edges of flooring boards together previous to nailing them down, by A. Smith; *described by us with, an engraving, page* 225.
148. Lamb's circular proportioners. 149. Sector and angular guages. 151. Portable smith's bench. 152. Improved coach wrench. 154. Proportional calippers, all excellent, by Holtzapffel and Co.
201. Instrument for drawing ellipses, on the principle of the trammel, by M. A. Nicholson.
202. Clement's apparatus for drawing ellipses, curves, spirals, &c., an extremely useful instrument, beautifully made.
203. Ronalds's patent sketching instrument, by Holtzapffel; *particularly described by us, with engravings, page* 203.
204. Elliott's improved air pump; *described by us page* 215.
205. Crossley's patent self-registering rain guage; *described by us, with an engraving, page* 288.

215. Green's spring stirrup; *described by us, with an engraving, page* 199.

216. Luken's patent pad and collar; pad *described by us page* 224, collar *page* 232, *with engravings.*

218. Patent hinges, by Redmund. These are too valuable to be slightly passed over; we shall ere long give a very particular description of them.

219. "Patent swivel castor," by T. C. Salt, Birmingham; apparently nothing but a common castor well finished; but not a tithe so good as *Harcourt's patent castor, described by us in vol.* 4.

220. "Royal filter, invented and manufactured by Messrs. Robins." This appears to be a sad piece of quackery, and nothing but the ordinary filtering apparatus that has been in use these ten or fifteen years past, only made of more unsuitable, yet more expensive materials. We are informed that the water, after passing through the sponge as in other filters, is finally purified by passing through a carbonaceous composition. The construction of the machine, although *called* a *patent,* is kept secret: this, however, does not enhance its value in our estimation, but affords a strong presumption that it will not bear scrutiny.

221. W. James's filtering apparatus; *described by us, with engraving, page* 230.

222. "Filtering machine by capillary attraction." This was the designation of the article upon the label suspended to it; accordingly, in our description of it, page 220, we observed that the principal part of the apparatus was unnecessary to effect the object thereby proposed; but it now appears by the catalogue just published, that "it is found useful in those cases of chemical manipulation in which the gaseous compounds united with the water are to be prevented from contact with the atmosphere."

223. Berrollas's patent keyless watch; *described by us very fully, with engraved illustration, page* 4, *present vol.*

224. Improved clepsydra, or water clock; sent in by C. F. Partington. This is a simple and well arranged apparatus, and will, therefore, be shortly described by us.

225. "Marriott's royal patent dynamometer." Invented by Regnier about fifty years ago, and since published in many of the scientific journals. We do not perceive that Mr. Marriott has made the least improvement or even alteration in it, although he calls it his patent. Mr. H. R. Palmer, the civil engineer, did, however, introduce an improvement upon Regnier's dynamometer about four years ago, which, although a valuable one, (as rendering the instrument far more useful or correct in its indications), he gave up to the public, by permitting us to publish *an exact description of it, with an engraving, vol.* 3, *first series.* Mr. Palmer's improvement is equally applicable to weighing machines.

226. Indicator of repulsion, to shew the force of a blow; by H. Marriott; *described by us page* 222. We now observe that the graduated scale does not range far enough, as a friend of ours, a powerful young man, repeatedly forced the index by a blow to the top of the scale, which indicates 450 pounds!

227. Patent portable water closet, by H. Marriott.

228. Do. by Wiss.

229. Do. by Downes, of Holborn; *will be described by us, with engravings, in our next.*

230—233. Portable guns and pistols, in the shape of walking sticks, whips, &c. by J. P. Hubbard.

234. Bailey's improved window casement; *described by us, with an engraving, page* 205.

235. Tuely's patent revolving window; *described by us, with an engraving, page* 207.

236. Jones's patent iron wheels; *fully described by us, with engravings, page* 65.

239. Specimens of brass artillery, *eight ouncers*, by W. Morgan.

240. Lee-shore sail, to enable the crews of stranded vessels to communicate with the shore, by H. Francis.

241. Belts for securing lunatics, without injury, by Taylor.

242. Improved trepanning instrument, by J. Cluley; *described by us, with an engraving, page* 230.

243. A walking-stick, covered with whalebone, containing a mariner's compass, with opera glass, telescope, pens, ink, &c. &c.

244. A portable horse measure.

245. Domestic telegraph, by H. Marriott; *described by us, page* 213.

246. "Fryer's improved washing machine." We do not ourselves discover wherein the *improvement* in this machine consists, but we purpose describing it at some future opportunity, chiefly because we have never had a washing machine described in the Register, which has arisen from our having hitherto considered the washer-women as the best machines.

247. Apparatus for cleaning knives expeditiously, by Taylor. At the time we are writing there is only a drawing of this apparatus suspended in the gallery, the machine not having arrived as expected. From the drawing we should say that the invention "is a lame and impotent attempt." The drawing is, however, in very bad perspective, and may represent the essential parts very incorrectly: therefore, should we find that the machine (when it arrives) is calculated to clean knives well and expeditiously, we shall faithfully describe it in one of our early ensuing numbers.

249. Patent machine for corking bottles, by J. Masterman. This very admirable contrivance *was described by us in detail, with engravings, in our 4th vol. first series.*

250. Patent machine for filling bottles, by J. Masterman. This equally ingenious and valuable invention is also *fully described by us with engravings, same vol.*

251. Bright's shadowless lamp. This very interesting and curious

apparatus *is described by us, with a sectional engraving to explain the principle, page 200.*

253. Sieves and strainers for culinary and other purposes, perforated by Lariviere's patent machinery. The perforations are very uniform and perfect; some specimens are extremely minute; we shall soon take further notice of this, and describe the process by which it is executed.

258. Highly-finished spinning wheels, by Marshall.

259. Dawes's patent recumbent chair; *particularly described by us, page* 134.

266. Patent peripurist, or cooking apparatus, by Tozer & Co.; *described by us, with engravings, page* 232.

267. Patent tea urn, by Sharp; *particularly described by us, page* 198.

268. Self-acting alcoholic blow-pipe, by S. Jones, for expeditiously boiling small quantities of water: *a cut is being prepared of this, which will shortly be inserted with description.*

269. Portable warm bath, by J. Benham. The bath has a small boiler of copper at one end, the sides, top, and bottom of which are double; round these the water from the bath is made to circulate by the action of the fire, and thus heat the whole. *A sketch of this is being engraved for an ensuing number.*

270. "Improved wheat mill," by Yearsley, of Holborn. We are not sensible wherein the *improvement* consists, but we shall examine it particularly, and faithfully describe whatever exclusive merit it may possess. It appears to be ably executed and to perform well.

271. Portable flour dressing machine, also by Yearsley: the preceding remarks equally apply to this apparatus.

272. Mill for husking Indian corn, made by H. Marriott; *described by us, with an engraving, page* 220.

273—274. Roasting jacks, by H. Marriott; good things enough,—but the remark made upon No. 270 applies to these.

275. "Patent dial-weighing machine," by H. Marriott. This is on the same principle as Regnier's machine.

ENGRAVINGS, PRINTS, &c.

PRINTS FROM ENGRAVINGS ON COPPER.—Nos. 155, 156, 159, 160, 178.

PRINTS FROM ENGRAVINGS ON WOOD.—No. 175. Various fine specimens by Mason. 176. Ditto by Hart, a self-taught artist. *This beautiful and elegant art, so little understood, is copiously explained, with illustrations, by the above Mr. Mason, page* 41.

PRINTS LITHOGRAPHIC (from drawings on stone.—Nos. 157, 158, 182, 183, 184, 185, 186, 187; comprising 34 beautiful specimens of this art, executed by Engellman and Co., and Hullmandel, from the drawings and paintings of first rate artists.

PRINTS EXECUTED IN GOLD AND SILVER, from wood cuts, type, &c., No. 177. Many specimens by Howlett and Brimmer.

STEREOTYPE PLATES.—188. Specimen of an adaptation of the stereotype process to obtaining copies from copper plates.

SEAL ENGRAVING.—No. 168. Fine specimens by Collins. Nos. 169 to 173. Various ditto by F. C. Phillips.

PAINTING ON WOOD.—No. 141. An imitation of marble by J. Cuthbert.

DRAWINGS.

179. Specimen of architectural pen and ink drawing by W. Bardwell.

180. Perspective drawing of the interior of a gentleman's work room, by C. Holtzapffel.

181. Perspective drawing of Lyne's comb-cutting machine, by one of the pupils of C. Davy, at the London Mechanics' Institution.

189. Design for a Waterloo monument, proposed to be erected in St. James's Park, by T. Wilson.

190. Design for a country retreat, by C. Davy; being one of a series which this clever and persevering artist intends publishing.

197. Magnificent design for a metropolitan sepulchre, by T. Wilson. This is an extremely large coloured drawing representing a stupendous edifice of brick-work, faced with square blocks of granite, which is proposed as a general cemetery for the whole of the inhabitants of London. The base of it would occupy an area of 40 acres, the length of the ground-line being 1200 feet. The height of it is intended to be 1500 feet, (nearly four times the height of St. Paul's.) The Projector has published a prospectus of the details and objects of the work, which will be found annexed to the beautiful drawing exhibited in the gallery.

BAS-RELIEFS.

161 and 162. Two subjects of this novel and curious imitation of sculpture and painting, by means of loose wool, are *particularly noticed by us, page* 221.

163 to 165. Fine heads of George III. and IV., in sardonyx, by Phillips.

166. A horse, in wax. 167. A youth, in wax, by Phillips.

BRONZE FOUNDRY, GILT AND PLATED WORK, &c.

137. Two large highly finished copies of the celebrated Warwick vase, in metallic bronze, by E. Thomason, Birmingham.

138. Specimen of silver gilt plate, elegantly chased in a novel style, by E. Thomason, of Birmingham.

217. Specimens of brass and bronze foundry, by T. C. Salt.

252. Specimens of gilt frames of a novel kind, by Watson.

CUTLERY.

210—211—212. Various cases filled with an extensive assortment of beautiful specimens of all kinds of cutlery, from several houses in Sheffield.

FINE TURNERY AND CABINET WORK.

142. A curiously ornamented black-wood box, illustrative of the nature of eccentric turning, by Holtzapffel.

143. A glass-case, containing various beautiful specimens of orna-

mental turning, which to the uninitiated would appear impossible to execute by circular movements only.

145—146. Highly finished and novel ivory turning, by Calvert.

147. Machine skewers, being extraordinary specimens of extremely delicate light-wood turning, executed in a common lathe, by E. Wyatte, Manchester.

152. An ivory box, with a *profile*, turned in a common lathe, by Holtzapffel.

215. Highly finished dressing glass, by Wellsteed.

246. Beautiful drawing cases, by Holtzapffel.

262—268. Specimens of India and Buhl-work, by Calvert.

MISCELLANEOUS ARTICLES.

150. Kaleidoscopes of a novel description, by Holtzapffel.

174. Specimen of lithographic transfer paper, by Bowles.

199. Organic microscope, by G. Francis.

206. Terrestrial globe, the largest in England, by Addison.

207. Patent keramographic globes, by Addison. These globes enable the teacher not only to exhibit to his pupils a more correct image of the surface of the earth, but gives the latter an opportunity of exercising themselves, than by merely looking at one, will at once appreciate the present invention, as leading to an essential improvement in the mode of teaching geography.

208. Improved musical glasses, by Tait; *described by us, page* 223.

209. Self-acting piano-forte, by Clementi & Co. This is a very beautiful instrument, furnished with keys in the ordinary way for a person to play upon; in addition to this, there are two barrels, each arranged to play nine tunes; the velocity is regulated by the action of two revolving balls, similar to the governor of the steam engine.

214. Ornamental ladies' riding saddle, by Clarke.

254. Popes' malleable zinc pipes; lighter, more durable, and cheaper than lead, it is said?

255. A sheet of malleable zinc, sent in by C. F. Partington.

256. Patent cork sheets, cut very thin, used for making hats, sent in by Lloyd & Co.

257. Water-proof cloth and leather, by Hancock.

260. Alva marina mattrasses, by Huxley & Co. The sea grass, of which these mattrasses are made, has some valuable properties it is stated.

261. Mackintosh's elastic air pillow, rendered impervious by a solution of caoutchouc.

TO OUR READERS AND CORRESPONDENTS.

We shall insert in our next MR. STEENSTRUP's improved Machinery for Propelling Steam Boats;—and LIEUT. COOK's Apparatus for saving the Lives of Men who may accidentally fall overboard at Sea during the night;—and DOWNE's Patent Water Closet;—also, the Communications of BRITANNICUS, X. Y. Z.;—and several novel Inventions.

HENRY R—N is replied to by the post. W. B.'s Paper we cannot insert.

Fig. 1.

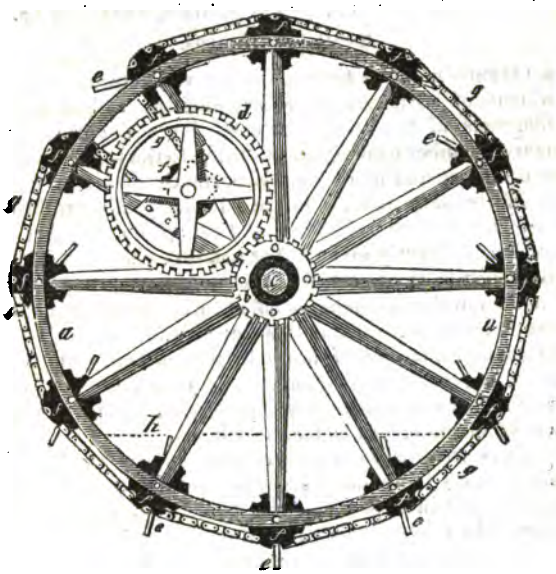
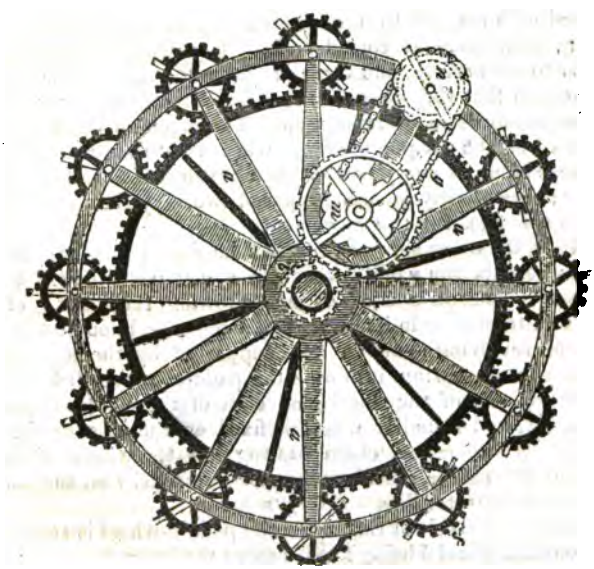


Fig. 2.



PATENT MACHINERY FOR PROPELLING.

[illegible] MACHINERY FOR [illegible]

[illegible]

[illegible]

[illegible]

[illegible] ... been found so advantageous as paddle-wheels.

[illegible] that in the common form of these wheels, with the paddles fixed in the direction of radii, some power must be lost in depressing the paddles in their descent into the water and in raising them out of the water in their ascent, when they have to lift a portion of water, called the back-water. In most of the attempts to remedy this defect, the inventors have caused the paddles to maintain a perpendicular position throughout the revolution of the wheel; and very different opinions have been recently entertained with respect to the angle at which they ought to enter the water; many persons consider that they should always be perpendicular to the surface, and there are others (among whom are our humble selves) that they should have a certain obliquity, varying as the paddle advances in its revolution. The patentee observes, that as every part of the periphery of the wheel must describe a cycloid, the paddles should at every part of their revolution form tangents to that curve; accordingly he has proposed two very simple and ingenious modes of effecting this movement.

Fig. 1, on the other side shews what he deems the simplest method: *a* represents the paddle-wheel; *b* a cog wheel bolted to the vessel's side, concentric with *a*, and allowing the shaft *c* of the paddle-wheel to revolve in its centre; *d* a cog wheel double the diameter of *b*, revolving upon an axis supported by the arms of the paddle-wheel and gearing into *b*; *e* the paddles suspended by axles turning in the rim of the wheel; on each of these axles is fixed a chain wheel *f*, and a similar wheel is fixed on the axis of the cog wheel *d*; *g* is an endless chain passing *over* the wheels *f* on the periphery of the paddle-wheel, and *under* the wheel *f* on the axis of *d*; *h* represents a water line.

It will now be perceived that when the paddle-wheel is set in motion, the toothed wheel *b* being fixed, causes the larger toothed wheel *d* to revolve upon its own centre, at the same time that it is carried

round by the paddle-wheel in a manner similar to the sun and planet wheel in Watts's steam engine. The wheel *d* being double the diameter of *b*, will perform one revolution upon its own axis in the same time that it is carried ronnd once by the paddle-wheel, and by means of the endless chain passing under the small wheel *f* on its axis, will cause each paddle to revolve once on their axis in the same time; and each paddle is constantly directed to the highest point in the rim of the wheel, which position of the paddles, by a diagram accompanying the specification, the patentee shews is nearly the required tangent.

Fig 2 shews the other method; instead of the endless chain, a large toothed wheel is placed loose on the axis of the paddle-wheel; this toothed wheel acts upon the wheels fixed on the axis of the paddles, and is put in motion by an endless chain *g* passing over a small wheel *m*, placed on the axis of *d*, and over a similar wheel *n* in the axle of one of the paddles. The other parts being similar to those in fig. 1, require no further explanation.

The patentee proposes in general that these wheels should be immersed in the water about one third of the diameter, which is considerably more than the wheels at present in use can be immersed, and thus the same number of paddles can be brought into action as in a wheel of larger dimensions; he indeed states, that *the wheel will work well when totally immersed, and in any position, oblique, horizontal, or perpendicular.*

Since writing the foregoing we have received the following account of some interesting comparative experiments recently made between the common, and the new wheel of the patentee, which entirely agrees with the statement (in italics) in the last paragraph.

July 21, 1828.

SIR.—I beg leave most respectfully to solicit your attention to my newly-invented patent paddle-wheel, to prove the advantage of which, by practical experiments, I caused a paddle-wheel to be made according to my patent, which wheel is so constructed, that it can also with facility be made to act as a common paddle-wheel, that is, with paddles or float-boards fixed radially. This wheel is 4½ feet in diameter, it has 10 paddles 15 inches long, and 8 inches broad, and I have suspended it between two boats, from which it in different degrees immersed, can be worked by a couple of men.

I have tried it upon the river Thames with a load in the two boats of about 1500lbs., and the following are the results of my experiments:—

A. The propelling power of my wheel increases in proportion to its immersion in the water, and is greatest when entirely sunk under the water's surface.

B. The paddles in passing through the water, do not lift nor depress it, nor does the working of the wheel cause any trembling of the vessel.

C. The backwater or swell is insignificant, and hardly perceptible, when the wheel is sunk under water.

In order to obtain a satisfactory trial as to the propelling power of my patent wheel, compared with that of a common paddle-wheel, I caused the boats to be several times propelled during high water across the river, and back near Temple Gardens. One trip was made with the wheel altered to a common paddle-wheel, and the others with it formed according to my patent, and for each of these it was sunk to a different degree in the water. The number of revolutions and time required for each trip were correctly noted, of which the following are the particulars :—

1. The wheel altered to a common paddle-wheel required......	198 revolutions	in 6¼	minutes.
2. The patent paddle-wheel sunk 8 inches in the water required	176 do.	5¾	do.
3. The same immersed ¼ of its diameter required............	155 do.	5½	do.
4. The same immersed between ¼ and ½ of its diameter required	154 do.	5¼	do.
5. The same immersed entirely in the water required..........	128 do.	6	do.

The number of revolutions required for the same distance, are in an inverse proportion to the propelling power, and therefore the propelling power of the patent paddle-wheel sunk as in trial No. 4, is more than 25 per cent. higher, and entirely immersed as in trial No. 5, is about 50 per cent. higher than that of a common paddle-wheel.

That the before-mentioned trials have been correctly represented, I can prove by witnesses, and will when required, repeat the same, provided due notice will be given to me, before the wheel is sent to the Continent.

I am, Sir, &c. &c.

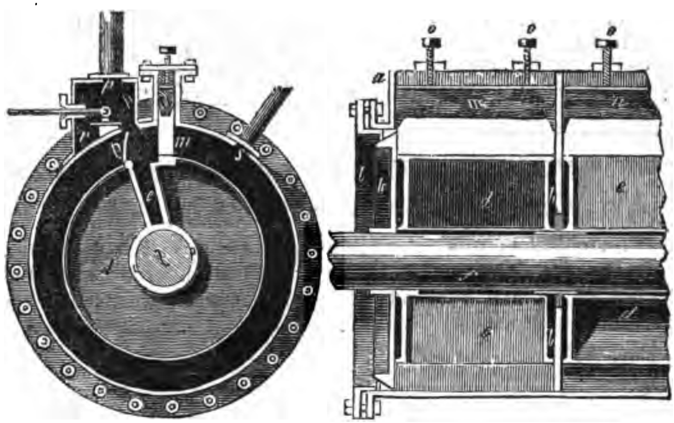
P. Steenstrup.

No. 3, Basing Lane, Bread Street.

NEW PATENT ROTARY STEAM ENGINE.

By John Evans, Jun. of Wallingford, Berks.—*Enrolled July 15, 1828.*

This engine is of the rotatory kind, and is composed of a long cylinder *a a*, laid horizontally, and divided into two equal parts by a disk, or broad flanch *b* in the interior; in each compartment is a drum *d*, composed of two concentric cylinders, cast in one piece, and a channel *e* is formed, extending the length of the drum, and reaching from the larger to the smaller cylinder, the object of which is stated to be to *obtain greater surface.* Through these drums passes an axis *f*, with small projecting feathers, fitting into corresponding grooves in the interior cylinder of the drum, which thus comes round the axis. Attached to the periphery of the drum by a hinge is a flap or piston *g*, which is of somewhat greater diameter than the channel *h* left between the drum and the exterior cylinder *a*,



and placed immediately over the cleft or channel *e*. The drums are pressed against the disk *b* by the end plates *k*, of the same diameter as the cylinder *a*, and having their upper surface bevilled round the rim to receive the packing, which is covered by a flat hoop, pressed down by a short cylinder *l*, by screws screwing into the flanch of *a*, so that no steam can escape between the drum and the disk *b*, or the end plates *k*. The drums must be so placed on the shaft *f*, that when the cleft *e* of one drum is on the highest part of the shaft, that on the other drum shall be on the lowest part of the shaft. Along the upper side of the cylinder *a* is fixed a groove, through which descends a stout shutter on to the drum or abutment *m*, faced with brass, and having above it a packing of hemp *n*, covered with a plate of metal, pressed down by the screws *o*. The steam is admitted by the steam pipe *p* into the steam box *q*, (of which there are two, one to each drum), furnished with a slide valve *r*, regulated by an eccentric on the axis; *s* is the eduction pipe. The steam being admitted into one compartment, acts against the shutter *m* and the piston *g*, and causes the drum and shaft to revolve; when by the revolution of the drum, the piston of the other drum is carried past the aperture in the steam box *g*, the steam is admitted to it, and shut off from the first compartment, and the revolution of the shaft is thus continued by the admission of steam into each compartment alternately, during half a revolution. The eduction pipe may communicate either with the condenser, or the atmosphere.

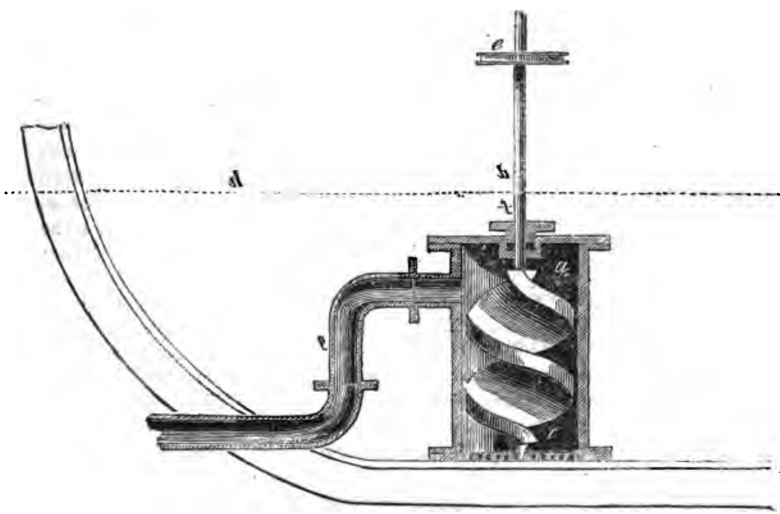
This invention is so similar in its general features to numerous rotary engines before proposed, that we should not have given it a place in our work, had it not been to notice an error into which we should have thought it impossible for a person describing himself as an engineer to commit. We allude to the forming of the cleft *e* "*to obtain greater surface*," by which is understood, that the steam will act upon the surface of the cleft, as well as upon the piston *g*, whilst the steam expended will be merely that comprised in the space between the drum and the cylinder *a*.

It will be needless to observe that the steam, acting upon each side of the cleft, can have no tendency to force the piston either way, and the error is the same as if we were to endeavour to augment the power of Bramah's press by increasing, not the diameter of the rim, but that of the cylinder containing it.

NEW PATENT METHOD OF PROPELLING VESSELS.

By W. Hale, of Colchester.—*Enrolled June* 22, 1828.

The object of this patent is to impel steam vessels by means of a stream of water forced out astern, at a considerable depth below the water line, and thus dispensing with paddle-wheels which are considered both unsightly and inconvenient.



a is a cylinder closed at top, and having a grating at bottom, which serves to keep out weeds, &c. This cylinder is firmly secured to the bottom of the vessel, so as to have free communication with the water, whilst the water is prevented from entering the ship or vessel by caulking, &c.; the top of this cylinder must not be above the water line; *b* is a screw of two or more threads, very nearly, but not quite in contact with the sides of the cylinder, and revolving upon a spindle in a socket at *c*; *d* the shaft by which the screw is caused to revolve, driven by the band-wheel *e*, and turning in a stuffing box *f*; *g*, a pipe leading from the upper part of the cylinder, through a hole in the lower parts of the vessel's stern; *h*, the water line.

By causing the screw to revolve with rapidity, a stream of water is drawn through the cylinder and forced out astern through the tube *g*, by the resistance of the surrounding fluid the vessel is forced

forward. The patentee also proposes to produce the same effect by substituting pumps for the screw, keeping the upper parts of the pump cylinders below the water line.

** The inconveniences attending paddle-wheels are so numerous as to render an effective substitute for them, and free from their defects, one of the greatest desiderata in steam navigation, but no method hitherto proposed has been at all comparable to them in point of power. The present, or very similar plans, has been before frequently suggested.

In the commencement of steam navigation, a Mr. Linaker, of Portsmouth, proposed to lay a pipe along the bottom of the vessel, with valves opening towards the stern, and to expel the water by the direct action of the steam as in Savery's engine, instead of employing pumps; and in 1820, Messrs. Lilley & Frazer, obtained a patent for propelling vessels by means of pumps, which should receive water at the bows of a vessel, and discharge it on the quarters. As for the screw, it has been, as we before observed, frequently proposed, though not in the position chosen by the patentee, but placed horizontally at the side of the vessel, where from the obliquity with which it struck the water, sufficient speed could not be obtained; but as the present patentee, Mr. Hale, says a pump may be substituted for it, we cannot expect greater effects from it, than from the plans before-mentioned. We therefore apprehend that the present mode of propelling with paddles must still continue, notwithstanding their radical defects, and with merely some improvements in their construction.

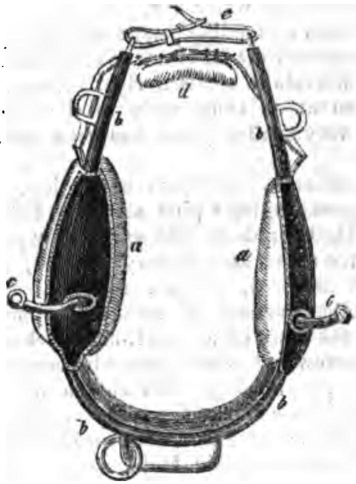
NATIONAL REPOSITORY.

According to our expressed intentions, we commence adding to our previous account of every article in the Repository an enlarged description of such inventions as from their intrinsic value require it from us; and of introducing a regular notice of all the *new* subjects brought into the gallery from time to time; so that our country readers, who may not have the opportunity of viewing the exhibition itself shall have the whole of its contents faithfully described and illustrated with engravings wherever necessary or desirable. In this department of our work (in which it is universally admitted that we have always surpassed our contemporaries) we shall not be unsparing of expense, being of opinion with Mr. Stuart, that "in the description of machinery, *a line of engraving is worth pages of letter-press.*"

LUKIN'S PATENT HORSE COLLAR.

In our last number we gave a brief description of this new horse collar, but the subjoined engraving being missed at the time of making up for the press, and was necessarily omitted: it conveys a precise representation of the real article in the Repository, and as it is considered a desirable improvement in that useful branch of

art, collar making, we deem it not too late to insert the cut, now that it is found.



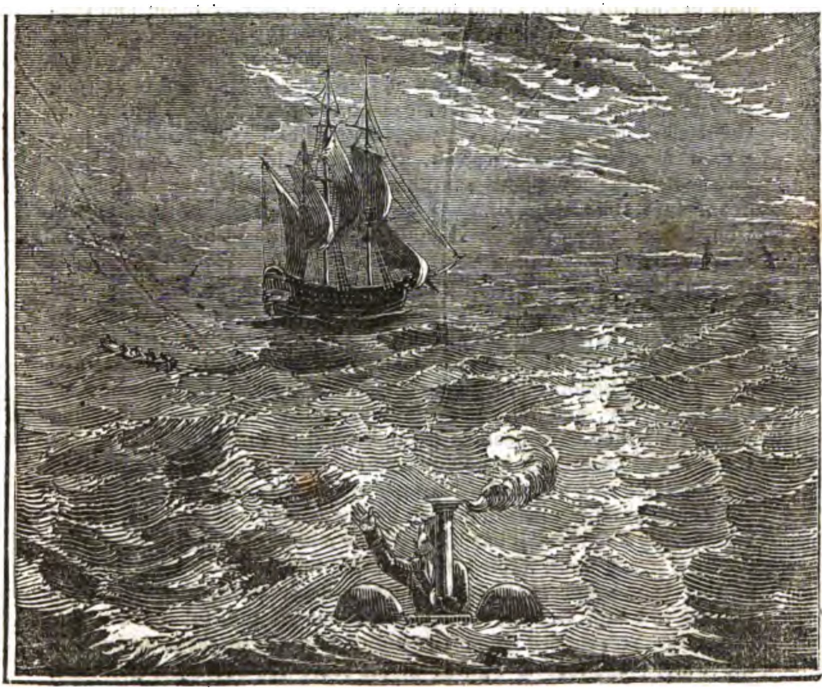
The figure represents at *a a* the pads, one turned partly round upon the hames *b b b*, to shew their action: *c c* are the clips for the traces; *d* a small pad which lies over the horse's neck; and *e* the straps by which the collar is contracted or allowed to expand.

IMPROVED NIGHT LIFE BUOY,

By Lieut. Cook, R. N., Manufactory 127, Long Acre.

We are gratified to find that this valuable invention has found its way into the gallery of the National Repository, as that circumstance will tend greatly to its more extensive application to mercantile ships; with respect to the navy, it is now upwards of eight years since the Lords Commissioners of the Admiralty issued instructions, directing that every ship in His Majesty's service should be fitted with this life buoy. Its object is to save men, who may have the misfortune to fall overboard at sea, by night or by day. The buoy is so fitted to the stern or quarter of the ship, that in the event of an accident by night, it can be detached from its position into the water in about ten seconds, with a fuse at the head of the staff, giving a brilliant light, which a sea passing over cannot extinguish.

The ship, if under a press of sail at the time, may run for half a mile, or even a mile, before she can shorten sail sufficiently to heave to with safely; but the buoy, having fallen close to the man in the water, buoys up not only his body but his spirits, for he is fully confident that the light blazing above his head, will direct the boat to the spot, without a moment's loss of time. All sailors are aware



of the difficulty of finding a man in the water in a dark night. Men have been left to perish, who it was known had reached whatever might have been thrown to their assistance, owing to the impossibility of discovering the spot in which they were suspended between life and death. This is a fact, declared to the inventor by an officer of high rank in the naval service; and this fact is alone sufficient to show how great a desideratum was the invention of the Night Life Buoy.

A proper feeling of humanity would dictate that a vessel ought not to be considered complete for sea without this appendage; for a great number of men now owe their lives to it. Not only the British, but the Russian, the Dutch, and the Danish goverments have adopted it. The inventor has been informed, that in a frigate, as many as *nine* men were saved by the life buoy, during one voyage to the East Indies; in other ships, five men; in others, three, &c. &c. In short, the trial which it has had for eight years, has fully established its importance and utility; which are now generally known to, and acknowledged by the maritime world.

In order that the merchant and packet services may have an opportunity of being provided with life buoys, the inventor has been induced to make arrangements, by which they will in future be prepared under his immediate inspection, at the manufactory, 127, *Long Acre*. This is necessary, as the *fuses* form the most important part of this invention; and unless they are properly made and correctly proportioned, no dependence can possibly be placed in them; in fact, instead of being the means of saving life, they would probably occasion both the loss of men and life buoys. If made too strong they burn out too quickly; and if made too weak they will not resist the dash of the sea; different parts require to be differently proportioned for particular purposes. Indeed, so fearful did the inventor feel lest these should not be properly manufactured, that he would not intrust the making of them to any firework-maker in London, who, however well instructed and disposed to do justice, for want of *experience* in constructing this difficult article, might fail to produce invariably such a one as could be depended on in all climates, and under every possible circumstance. Such being the case, the Board of Ordnance have granted to Lieut. Cook, the inventor, the exclusive privilege of having the fuses for the mercantile services, manufactured at the Royal Laboratory, Woolwich, where they have been made for the royal navy, and fully proved for the last eight years; during which time they have been so roughly tried in various climates, that the greatest confidence is now placed on their never-failing quality; *and for these only will he hold himself responsible.*

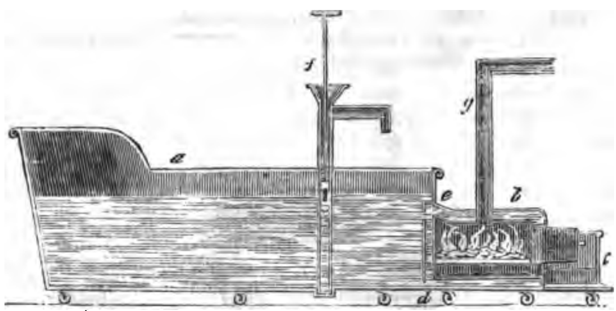
The apparatus consists of two hollow copper spheres, connected together by a horizontal bar, through the middle of which is fixed vertically a strong staff, formed of a metallic tube; the upper extremity of this tube supports the fuse, and the lower portion contains the balance rod and weight, which drops out of the tube, when the apparatus is released from the ship, and preserves it upright in the water; the fuse is lighted at the same instant by a gun-lock.

The first of the annexed cuts represents the life buoy, as fixed to the stern of a vessel. In many ships, the communication with the triggers for firing and letting it go is so contrived, that the man at the helm can detach it without quitting his post; and when detached, the balance weight at the bottom draws out a rod from a tube in the staff, sufficiently far to keep the buoy steady in the water. The second plate represents the life buoy in use, with the fuse blazing over the head of the man, who is standing on the balance plate. A boat is seen directing its course towards the spot.

PORTABLE WARM BATH.

Manufactured by J. Benham, of Wigmore Street, Cavendish Square.

In our notice of this invention in our last Number, we proposed giving a cut of it, and as an external view does not exhibit its construction, we have given a section of it.



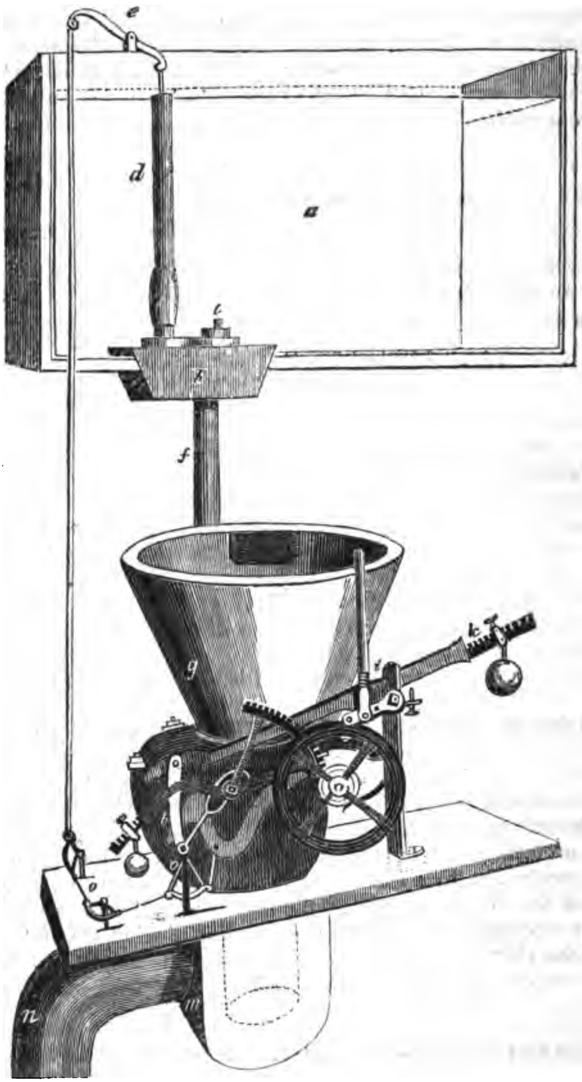
a represents the ordinary bath filled with water to the proper height; *b*, a furnace for heating the water, and *c*, a fender to keep in the fuel and ashes; at the end *d e* the bath has a double case, at the top and bottom of which there are apertures communicating with a double cased boiler that entirely surrounds the fire. The water thus heated naturally ascends and enters the bath at *e*, while the cold water to supply its place, enters the boiler at *d*; therefore a continued circulation of the water is effected by this arrangement, so as to heat it very quickly, and by a small fire, more conveniently and agreeably situated than if placed under the bath as usual; *f* is a pump, the lower end of which dips into a small well at the bottom of the bath, for discharging the water; *g* is a small wrought iron flue; the whole runs upon casters.

PATENT SELF-ACTING WATER CLOSET.

By J. Downes, of 145 High Holborn.

This is a highly ingenious and very effective invention for preventing the escape of offensive air from the basins of water

closets. It is put into operation by the removal of the persons weight from the seat, so as to be entirely self-acting, and independant of the usual attention of letting on the water.



a in the annexed engraving represents the water cistern placed as usual at a sufficient elevation above the closet to give the water an impetus; *h* is the service box, for regulating the supply, water

enters it by the valve *c*, and air by the pipe *d*. *e* is a small lever by which a communication between the valve *e* and the machinery is effected, as may be seen by the wires extending from one end of it down the pipe *d* and from the other to the cranks *o o o*. *f* is the pipe by which the water is supplied to the basin *g*. *i* is a pushing rod attached to the seat which is hinged at the back to a projection from the axis of the long lever *k*, so that when a persons weight is placed upon the seat the left hand end of the lever is pushed down till the pendant link at *b*, catches the hooked end of a one armed lever as represented in the figure. Now it will be observed that when the person's weight is removed from the seat, the balance weight *k* will descend and raise the link *b*, and with it the hooked lever which is attached by a looped connecting link to a toothed sector moveable on an axis which is connected to, and turns back the soil pan, when the water is let on by the elevation of the lever. When the upper lever rises to its greatest elevation the pendant link *b* slips off the hooked end of the lower lever, which then, by a counterpoise attached to the toothed sector, is brought back to its stationary position at the same time shutting the valve *c* and returning the soil pan to take in the bottom of the basin. The quantity of water contained in the service box, when its valve is shut, descends into the basin and fills up the soil pan and the lower part of the basin, thus preventing any escape of effluvia from the soil pipes. The use of the fly wheel which is put in motion by the toothed sector acting on a small pinion fixed on its axis, is to prevent by its inertia the water from being too suddenly shut off when the lower lever is liberated.

This closet though somewhat complicated in appearance is really simple in its action, and as manufactured by the patentee, not at all subject to derangement.

ON THE PROPER CONSTITUENTS OF MORTAR.

TO THE EDITOR.

Sir.—I do not know a subject which is less understood generally than the nature of mortar; that is, the just proportion of sand and lime; authors not only differ from each other, but also from themselves, and lead their readers *into* error rather than out of it; theory and practice are also diametrically opposite in this particular, most writers asserting, that it should be used as thick as possible, while the usual practice is to make it as thin as can be done, and afterwards pouring as much in (quite liquid) as the interstices will contain. Would any one of your correspondents be kind enough to communicate the due proportion of sand to lime for the best mortar in your weekly publication, he will confer a public benefit by submitting it for insertion. To shew the inconsistency of authors, I shall only state the last publication, it is by G. A. Smeaton, architect, and civil engineer, who in his "Builder's Pocket Manual," printed for Knight & Lacey, Paternoster Row, says, page 90, "the best proportions to make

mortar are, three parts of fine, and four parts of coarse sand, and one part of quick-lime and as little water as possible;" thus, we have seven of sand to one of lime; yet proceeding to page 105 of the *very same work*, he says, "that mortar generally in use for common purposes, is about a bushel and a half of lime to a bushel of sand," "putting in as little water as is absolutely necessary to make it of a proper consistence," here we have for seven bushels of sand, *ten and a half bushels of lime*, instead of one bushel in the first proportion. Now if the first proportion is the *best*, why need we be at nine times more cost to have a more inferior or more common quality.

Dr. Willich says, three of sand to one of lime is the common proportion; the first mentioned of seven of sand to one of lime, is I think, Dr. Higgins's proportion. Dr. Hook advised using as much liquid as possible in all brick buildings.

When doctors thus disagree, we want some practical person of sound common sense to set us right, and in hopes this will now be done through the medium of your work, remain a lover of fact.

BRITTANICUS.

July 10, 1828.

PORTABLE HOUSES.

To the Editor of the Edinburgh Observer.

SIR,—In passing the western extremity of Fountain Bridge Street, the other day, my attention was directed to a neat wooden building, in the immediate neighbourhood, over the door of which were inscribed the words, Portable House! As there was no appearance of portability about the edifice, curiosity tempted me to enter, when I found it a very snug habitation, inhabited by the inventor, a shoe maker, and his family, who readily gave all the information I wished as to this novel and ingenious contrivance. The plan is very simple. Each side is made up of three equal parts, each part reaching from the ground to the roof; two iron rods, furnished with nuts and screws, run across each side and pass edge-ways through the two contiguous sides, by which the four sides are held firmly together—joists are bolted to each of the sides by which the floors are supported. Each side of the roof is in one part; all the four sides are bolted together at the angles. None of the parts are larger than two men can easily manage. The whole house, which contains three flats, may be taken down, removed to a considerable distance, and put up again in one day by two men, with the assistance of a horse and cart. The advantages of the plan are so obvious, that I need not take up your time in enumerating them. Many delightful spots might be obtained for the site of a portable house, during the summer months, where there is no probability of a fixed house ever being built. To sportsmen, in particular, it would furnish a cheap and most comfortable lodging on the moors. Should you deem this notice worthy of a place in your journal, you will oblige your's, &c.

A CONSTANT READER.

SCIENTIFIC INSTITUTIONS.

London Mechanic's Institution.—Since our last notice of the proceedings of this Institution, the Friday evenings have been occupied with a course of Lectures on the *Functions* of the *Human Body*, by Dr. Birkbeck; and the Wednesday evenings, with a course on *Chemistry*, by Mr. Hemming. This course was however interrupted for one week, and a lecture on *the Effects of Poisons*, and the *duties* of jurymen in cases of accusation of poisoning, was delivered by Dr. Gordon Smith. We understood this to be the first of a series of lectures on *Medical Jurisprudence* and that they will succeed the present course on Physiology.

At the conclusion of Mr. Hemming's fourth lecture last Wednesday, it was announced to the members by Dr. Birkbeck, that an election of fifteen Committee Men would take place on Tuesday the 2nd September ensuing; and that Tuesday the 12th instant, would be the last day for receiving nominations of members to serve that office.

The President was on this occasion accompanied by M. Lemaire, Professor of Practical Geometry, in the University of Ghent, who has been sent to this country by the Government of the Netherlands, to attain information respecting the methods adopted in this country for communicating instruction to the working classes.

MISCELLANEOUS INTELLIGENCE.

The Nondescript.—"The bones of the Nondescript, lately discovered in a swamp near New Orleans, were lately exhibited in that city. The Mammoth, the remains of which have heretofore caused so much speculation among naturalists, must have been a mere pigmy, in comparison with the monster. The largest of the bones, appears to have been the left upper jaw-bone; it is 20 feet in length, and weighs upwards of 1200 lbs., with a remarkable projection in the form of a horn, about 9 feet long, and 7 or 8 inches in diameter, which must have been a weapon of defence; the others were in exact proportion. The vertebræ, or back-bone, is 16 inches in diameter, the passage for the spine, 9 by 6 inches, and the rib 9 feet long. After seeing these bones, we can scarcely any longer doubt the existence of the Kraken, and other monsters, whose history has generally been considered fabulous. The average of the estimates of the scientific, make the animal to which they must have belonged, about 175 feet in length, and of proper proportions."—*American Papers.*

Earthquake.—The shock of an earthquake was experienced over a considerable tract of the West of Scotland on the 20th ult.

Map of France.—A new map of France, on a very large scale, is at present executing under the direction of the Royal Corps of French Geographical Engineers. It promises to be exceedingly beautiful.

VOYAGE OF DISCOVERY.—An expedition is about to be sent by America on an exploratory voyage to the Pacific Ocean and the South Seas.

THE BREAD FRUIT TREE is about to be introduced into the gardens at Chiswick by the Horticultural Society.

PRESERVING WINES IN DRAUGHT.—A flask of olive oil poured into a cask of wine, by hindering the evaporation of its alcoholic part, and preventing it from combining with the atmospheric air, will preserve it for a very long time.

REMARKABLE BLOSSOM OF THE COCKSCOMB (*Celosia Cristata.*)—The following extraordinary dimensions will excite at once the surprise and pleasure of all who admire this beautiful plant. From the surface of the mould to the top of the blossom was 6 ft. 6 in.; the crest of the flower, measuring lengthwise, was 23 in., and its breadth about 3 in. The convolutions were compact, and of a beautiful crimson colour; it was exhibited in full perfection for several weeks, at a window in one of the principal streets at Oxford.—*Gardener's Mag.*

INDIAN TELEGRAPHS.—The system of telegraph has arrived at such perfection in the presidency of Bombay, that a communication may be made through a line of 500 miles in eight minutes.—*London Weekly Review.*

LIST OF NEW PATENTS.

STOPPING CABLES.—To James Moffatt, of King's Arms Yard, Coleman Street, for an improved apparatus for stopping and securing chain cables, and weighing anchors. Sealed June 3, 1828. Six months for enrolment.

WOOLLEN CLOTH.—To D. Jobbins, of Uley, Gloucester, for improved machinery to fulling machines. 3d June. Two months.

WATER-PROOF LEATHER.—To Baron Charles Wetterstedt, of Commercial Road, Middlesex, for a water-proof composition for leather. 4th June. Six months.

GAS.—To Richard Witty, of Hanley, Stafford, for improved apparatus for supplying coal gas. 12th June. Six months.

POWER.—To Edmond G. Alterley, of York Place, Russel Square, for an apparatus for generating power. 12th June. Six months.

ALUM.—To Wm. Strachan, of Ruabon, Denbigh, for an improvement in making alum. 12th June. Four months.

FLAX YARN.—To John Bartlett, of Chard, Somerset, for a new method of preparing flax yarn or thread for boot and shoe makers, &c. 16th June. Two months.

CAPSTANS, WINDLASSES, &c.—To George J. Young, of Newcastle-upon-Tyne, for a machine whereby an improved purchase will be given in working ships' windlasses and capstans. 21st June. Six months.

BEDS, CUSHIONS, &c.—To S. Pratt, of New Bond Street, Middlesex, for improvements in elastic beds, cushions, &c. 25th June. Six months.

FURRIERY.—To John Baring, of Broad Street Buildings, London, for improved machines for cutting the fur from skins, to be called "*The Cant-twist Blades Fur Cutter.*" 3d July.

PROPELLING.—To John Johnson Isaac, of Edgeware Road, Middlesex, for improvements in propelling floating bodies. 5th July. Six months.

LIFTING WEIGHTS.—To Thomas Revis, of Walworth, Surry, for an improved method of lifting weights. 10th July. Six months.

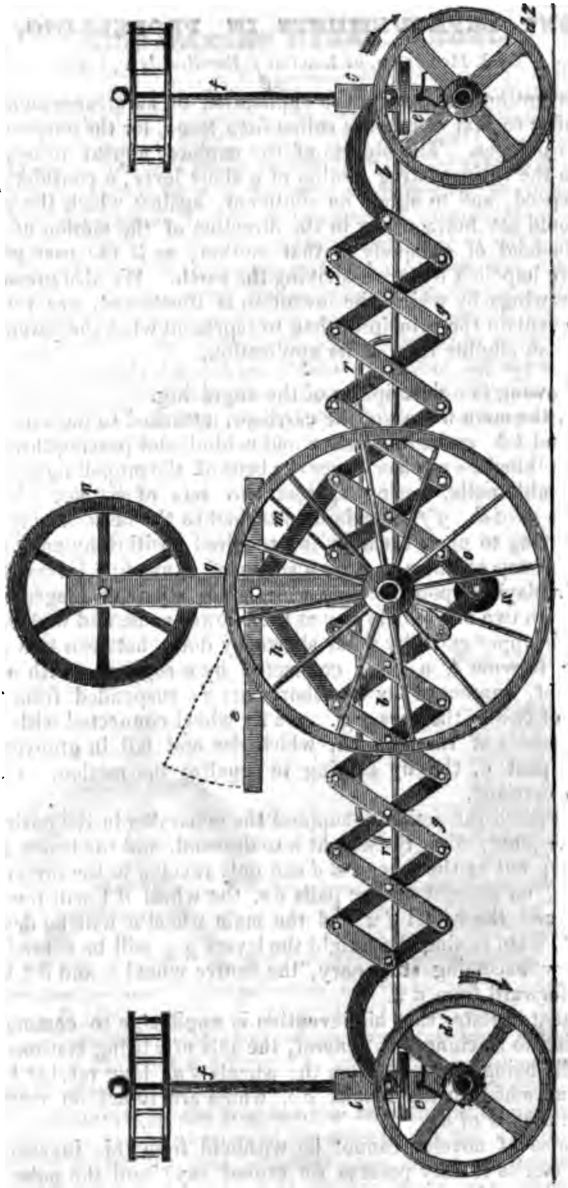
CABLE CHAINS.—To John Hawks, of Weymouth Street, Middlesex, for improvements in ship's cable and hawser chains. 10th July. Six months.

PIANO-FORTES.—To John Henry Anthony Gunther, of Camden Town, Middlesex, for improvements on piano-fortes. 10th July. Two months.

SCIENTIFIC APPARATUS.—To Captain William Muller, of Doughty Street, Middlesex, for an instrument for facilitating instruction in the various mathematical sciences, resolving problems, &c. 10th July. Six months.

HAT MAKING.—To Benjamin Rider, of Red Cross Street, Surry, for improvements in the manufacture of hats, which he intends to denominate "*Rider's Patent Hat Tips.*" 17th July. Six months.

SMELTING.—To Joseph Jones, of Amluch, Anglesea, for improvements in smelting copper. 17th July. Six months.



HOLLAND'S PATENT IMPROVEMENTS IN PROPELLING.

PATENT IMPROVEMENTS IN PROPELLING,

By J. HOLLAND, of London.—*Enrolled June*, 1828.

THIS invention consists in the application of an arrangement of levers, similar to that commonly called *lazy tongs*, for the purpose of propelling carriages. The objects of the patentee appear to be; to derive from the reciprocating motion of a short lever, a considerable degree of speed, and to obtain an abutment, against which the propellers should act horizontally in the direction of the motion of the carriage, instead of obliquely to that motion; as is the case when carriages are impelled by levers striking the earth. We also presume that the drawings by which the invention is illustrated, are rather intended to explain the principle, than to represent what the patentee would deem an eligible form of its application.

The following is a description of the engraving.

a, one of the main wheels of the carriage; attached to the axle is a long guide rod *b b*, extending before and behind, and passing through holes in the blocks *c c*, placed over the beds of the propelling wheels *d d*. *e e* double palls, acting against two sets of ratchet wheels on the boxes of *d d*. *f f*, standards attached to the beds or axles of *d d*, and serving to place them in any required position by means of the wheels at top of them. *g g*, a series of expanding levers, the central pair playing upon the main axle. *h h*, a pair of longer bars connected with two of the bars *g g* at their lower ends, and with each other at their upper ends by a bar shown by dots, between two uprights; the fulcrum *l*, a lever connected by a rope *m*, with *n* a counterweight, supported by two short bars *o o* suspended from the lower ends of two of the bars *g g*. *p* a fly wheel connected with the upper extremitles of the bars *h h*, which rise and fall in grooves in the upright post *q*, the fly serving to equalize the motion. *r* the platform or carriage.

To understand the action,—suppose the apparatus in the position shown in the plate, allow the weight *n* to descend, and the levers *g g* will collapse; but as the wheels *d d* can only revolve in the direction of the arrow, on account of the palls *e e*, the wheel *d* 1 will remain stationary, and the wheel *d* 2 and the main wheel *a* will be *drawn* towards *d* 1. On raising the weight the levers *g g* will be extended, and *d* 2 now becoming stationary, the centre wheel *a* and *d* 1 will be *pushed* forward from *d* 2.

The patentee states that his invention is applicable to communicating motion to machinery in general, the axis of *a* being stationary, and the palls being removed from the wheels *d d*, long ratchet bars are to be attached to the blocks *c c*, which are to act on ratchet wheels on the axis of *a*.

The praise of novelty cannot be withheld from this invention; what other merits it may possess we cannot say: and the patentee himself has been silent as to its advantages.

NEW PATENT HORSE SANDALS.

By W. Percival, of Knightsbridge.—*Enrolled July*, 1828.

Not content with imitating the *lords* of the creation by making aërostatic excursions among the clouds, it appears that horses have now taken it into their heads to imitate the *ladies* also by the wearing of *sandals!* Can it be with the view of preparing to celebrate, on the "light fantastic" hoof, their expected emancipation from the iron yoke of the wheelwright, by the introduction of steam carriages? But whatever may be the cause, or the motive, the fact is indisputable, that some of our most skilful artizans are zealously engaged in endeavouring to supercede the vile practice of *nailing* the shoes to their hoofs, which are henceforth to be fastened to their tender and delicate limbs only by bands, or ribbands, after the newest fashions of our most celebrated belles. The sandals of Mr. Percival being considered *peculiarly* elegant, and as affording free scope to the most graceful motions and positions of the hoof, whether that of horse or donkey, he has very properly secured to himself the exclusive right, property, privilege, &c. arising from the manufacture and sale thereof, by obtaining his Majesty's letters patent for the same; the specification of which being enrolled, we have, as in duty bound, given it an attentive perusal, and have now the pleasure to present such a report of it to our readers as will give them a clear insight into its excellence.

Fig. 1.

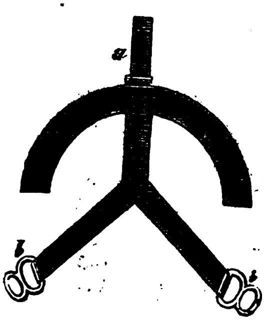


Fig. 2.

Fig. 1 represents the shoe, which is of the kind called the frog bar shoe; in the front is a tongue *a*, turning upon a hinge, and having two slits in it to receive the band or strap, and keep it in its place; at the extremities of the frog bar are two double loops or rings *b b*, turning upon hinges or holes in the ends of the bar.

Fig. 2 shews the shoe attached; the strap *c* of elastic web is passed through the lowermost of the two rings, through the lowermost slit in the tongue, through the lowermost ring on the opposite side, and through the uppermost slit in the tongue, and then through

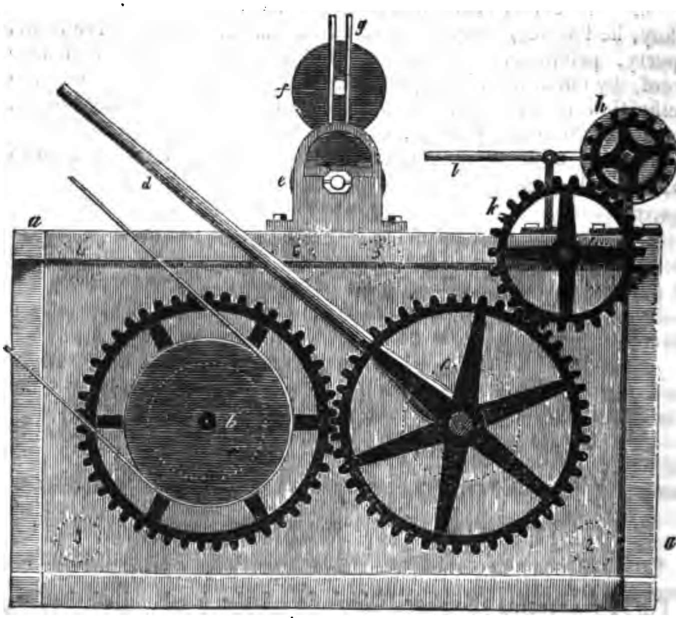
the buckle on the other end of the strap, and drawn tight. The strap *d* is passed through the uppermost of the two rings on one side, and over a pad *e* placed under the heel of the animal, then through the uppermost ring on the opposite side, and over a pad *f*, and secured by the buckle in the other end of the strap.

PATENT IMPROVEMENTS IN DYEING PIECE GOODS,

By J. Hall, Jun., of Ordsall, near Manchester.—*Enrolled March*, 1828.

To the uninitiated in the art of dyeing, as practised now-a-days, it must, we think, appear of all other arts the least susceptible of the application of *mechanical* ingenuity; yet the fact is far otherwise, and the invention before us is only one instance among numerous others of equal or greater ingenuity.

This improvement consists in exposing the goods to be dyed, to the action of the liquor in the dye vat in a more equal manner than is done at present, and is effected by the following arrangement.



In the dye vat *a* are placed six small rollers, Nos. 1 to 6, one at each corner and two near the middle on the same line with Nos. 1—4. At about half the depth of the vat are placed two larger rollers *b* and *c*, about one foot asunder: one end of each of the axes of these rollers comes through a stuffing box, and on the axis of *b* is placed a cog wheel which is connected with the axis by a pin passing through

it that can be withdrawn at pleasure; on the axis of *c* is a similar wheel gearing into *b*, and it may be thrown out of gear when required by the lever *d*. On the top of the vat is a roller *e*, whose axis turns in bearings fixed on each side of the vat, and upon this roller another roller *f* rests which can only move in a vertical direction, its axis being square and confined by guides *g*. At one end of the vat is a roller *h* supported in two upright forks, and having a small wheel on its axis; another wheel *k* on a short axis, is placed between the last-mentioned wheel, and the wheel and the axis of *c*, and gears into each. The roller *h* may be lifted out of the forks by the lever *l*.

To the roller *c* is fastened a piece of cloth of the width of the goods to be dyed; this cloth passes over the rollers 6 and 1, under 2 and 3, and over 4: a similar piece of cloth is wound round the roller *b*, the end of which is brought up and hung over the roller 5. The piece or web to be dyed is attached by a long skewer to the cloth of *c* hanging over the roller 4: the wheel *b* being now unpinned, and set in motion by a band wheel or other means, the web is wound upon *c* passing under the rollers as before described, until the outer end arrives at the roller 4, when it is attached to the cloth of *b* by a skewer, and the wheel turned until the cloth on *b* is unwound. The wheel on *c* is next thrown out of gear, and that on the axis of *b* is pinned to the axis, when the wheel being again set in motion, the cloth is unwound from *c*, and wound upon *b*: and it is thus wound alternately upon each of the rollers *b* and *c*, until it is deemed sufficiently dyed. It must then be wound upon the roller *b*, and the being detached from the web *c*, is passed between the rollers *e* and *f* and made fast to the roller *h*. The wheel on *b* is then unpinned, and being set in motion turns the roller *h* by means of the wheel on *c*, and the small wheel *k*; the piece is thus wound upon the roller *h*, deprived of a great portion of moisture, by the pressure of the rollers *e f*. When the end appears above the roller 5, the skewer attaching it to the cloth of *b* is withdrawn, and the roller *h* is lifted out of the forks by the lever *l*, and replaced by a similar one.

PATENT IMPROVEMENT ON CARRIAGE WHEELS,

By John Meaden, of Southampton, *Enrolled June*, 1828.

The improvement proposed by Mr. Meaden is to construct the tire or hoops of iron which surround the peripheries of carriage wheels, concave on the inner surface, next to the fellies, and convex on the external surface; the objects of which are, we suppose, to fix the tire more securely to the wheel, and to reduce the friction produced between the periphery of the wheel and the road. How far these objects will be attained in practice we have not at present an opportunity of investigating, but we are inclined to view the proposition in a favourable light, and shall be happy to learn from the patentee the result of his experiments: the subject is one of some importance, and well deserving of a fair trial.

The specification describes minutely the process for making tire

or hoops of the kind proposed, but our mechanical readers will, we doubt not, anticipate our explanation, as there is nothing whatever in it of a novel character.

A common flat wrought-iron bar, of the proper width and length, is to be passed between a pair of rollers, one of which has a concave groove, and the other a corresponding convex projection, so as to compress and bend the intervening bar into the required form. The bar thus formed is next bent round into a hoop of the required size, with the concave side inwards, and then the ends are welded together. To give the hoop the desired "dishing" or conical figure, it is placed over a large mandrill of cast-iron, of the usual kind (the frustrum of a cone), where it is hammered until it takes the required form..

To fix this hoop to the wheel, it is heated in a furnace or oven of a circular form, so that the fire may act uniformly upon every part; in a large wheel, this process of heating the hoop causes it to expand about one inch in its circumference, and thereby it is made just large enough to slip over the wooden wheel previously prepared, of greater dimensions than the interior circle of the iron hoop, in the cold state. Whilst the iron hoop is being heated, the wooden wheel is clamped to a flat circular plate, which is fixed to an axis to enable it to revolve, and this axis is fixed in a horizontal bar that turns upon its bearings, so that the wheel and iron plate to which it is clamped may be turned in either a vertical or horizontal direction. Underneath the circular plate is a semi-circular well containing cold water, into which the wheel is immersed and turned round, as soon as the hoop is put on it; the hoop expanded by heat is now contracted by the cold application, which presses the spokes into the fellies and nave with an immense force, and binds all the parts of the wheel together in the tightest possible manner.

Fig. 1.

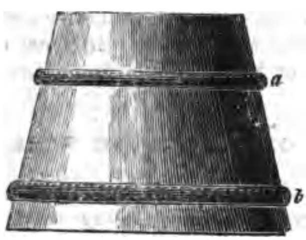


Fig. 2.

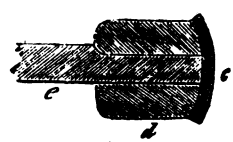


Fig. 1 represents the mandrill, on which the hoops *a b* are dished by the hammer; the conical form adapts itself to every variety of size that can be required, by having one sufficiently large. Fig. 2 exhibits a section of the new patent tire, the felly and the end of a spoke; *c* the tire; *d* the felly; and *e* the spoke.

NEW PATENT MOTIVE ENGINE,

By WILLIAM WILMOT HALL, of Baltimore, in America.

THIS engine which is applicable to all the purposes for which steam engines have been usually employed, is actuated by a mixture of steam and gas in the following manner. Into a steam boiler of any convenient form is introduced a pump called by the patentee a gas pump, in capacity about two-thirds of the working cylinder of the engine. This gas pump is made on the double action principle, and receives its supply of gas or heated elastic fluid from the chimney flue which is made to pass through the boiler, by a pipe communicating with the top, and another with the bottom of the pump: both these supply pipes are furnished with valves opening towards the pump; which is likewise furnished with two outlet pipes, communicating the one from its top, and the other from its bottom, into the upper or steam parts of the boiler. These pipes are likewise furnished with valves, but opening in a contrary direction to the others, or from the pump towards the boiler.

The packing of this pump piston must be metallic, and the valves or the communication between the chimney and pump must be lined with platina, to prevent their being injured by heat.

The piston-rod of the gas pump passes through a stuffing box at the top of the boiler, and is connected with and actuated by the working cylinder of the engine. After the steam is up, and the engine thereby put in motion, the chimney is closed by a damper situated just above the insertion of the supply pipes, when the hot elastic fluids issuing from the fire are pumped into the upper part of the boiler, where they mingle with the steam, and are conveyed in the usual way to the working cylinder.

We cannot ascertain either from the title, or the specification of this patent, whether the patentee intends by his invention to improve the effect of steam in actuating machinery, or to destroy the disagreeable effluvia arising from the flues of engines by mixing it with the steam in the boiler; we should imagine, however, that he intends the latter, as he gives in the same specification a description of a method of supplying the furnace uniformly with coals. And this he effects by placing over the furnace a hopper with a moveable piston-shaped bottom, perforated with a number of circular holes about six inches diameter. This hopper bottom is furnished with a vertical rod, by which it is suddenly lifted and let fall by every stroke of the engine, thus agitating the fuel in the hopper, and producing a regular supply through the circular holes in the bottom plate.

NATIONAL REPOSITORY.

SINCE our last account we observe that the following articles have been added to the collection.

278. Specimen of a new and improved black dye, in a rich black silk manufactured in Spitalfields. If it be true, as asserted, that

tea, wine, or the strongest acetic acid, may be applied to this silk, without in the slightest degree affecting its colour, or injuring its appearance,—the discovery is one of great value.

279. Toplis's improved carriage cushion and mattrass, which derive their elasticity from a combination of spiral steel springs with horse-hair. Is not this Pratt's patent, described in our former numbers?

280. Herschell's periscopic microscope, which is very compact and portable, and commands an extensive field of vision.

281. Lithographic printing press, by Whittock and Goodman. This is a very simple compact little press, with which the art of lithographic printing is performed in the gallery, to the gratification of numerous visitors.

282. Two specimens of engraving on glass, by W. B. Lee. One of the specimens is a wine glass, on which the Lord's Prayer is legibly written, within a circle of the same circumference as that of a six-pence. The other specimen is a hunting subject of horses and dogs on a goblet, extremely well executed, and affording a good example of what the art of etching upon glass, by the aid of fluoric acid, is capable of.

284. A superior Cachmere shawl, manufactured in Edinburgh.

285. Some fine specimens of gem and seal engraving, by R. Clint.

286. Specimens of shawls made from spun silk at Glasgow.

287. Specimens of stained paper, remarkable from the brilliancy and the variety of colours introduced—manufactured by Battam and Co.

288. Specimens of superior tabinette,—manufactured by Geoghan, Dublin.

290. The first-made model of a more complete full-sized apparatus for boring the earth for water or minerals; by which the boring rod inserted into the aperture is not extracted, until the perforation is completed; and by that means effecting a saving of about nine-tenths of the time and labour employed. By the Editor of this Work.

291. Specimens of cutlery in miniature; these consist of 13 pair of scissors of various sizes, the largest being only one inch in length, and the smallest barely one-eighth of an inch! Although made by some Brobdidnagians at Sheffield, we found them by examination through a magnifying glass to be very perfect in their figure, and we doubt not will be found by the ladies of Lilliputia to cut extremely well, for which island we presume they have been manufactured.

292. Specimens of wrought-iron nails, from Wright & Andrews, London. The nails are drawn out of iron rods by the hammer, and completely formed: 100 of them weigh 4 grains, or 25 to a grain. They are *said* to be a sample of the nails manufactured to the order of the king of Lilliput, for re-building his navy, lately swallowed up by a voracious sea monster.

293. Quarrel's "Albion State Lamp," which is contrived to ensure a constant supply of oil to the cotton, without throwing any

shadow. We purpose dissecting this lamp, for the benefit of our readers.

294. A splendid Peruvian steel fender, manufactured by Messrs. Pickslay & Co. of Sheffield. It is precisely similar to one manufactured for the king. The workmanship and the design are alike highly creditable to the above mentioned house.

295. Another superb steel fender ornamented with brass, by the same manufacturers.

In addition to the foregoing, there are a few subjects not yet numbered, which we shall describe in our next, as we have not had time to prepare the diagrams, which are desirable for illustration.

IMPROVED WATER CLOCK, NO. 224.

Sent into the Repository, by Mr. C. F. Partington.

The construction of clepsydræ, or water clock, is of very ancient date. In some of the earliest, a series of lines were made upon a vessel containing water, which as it discharged itself, successively brought the marks into view, and indicated the time; but this was found to be very incorrect, owing to the constantly varying pressure of the column of water as it diminished in height. A preference was therefore given to water clocks constructed upon an opposite principle, namely, such as denoted the progress of time by the gradual *filling* of a vessel instead of *emptying* it; as the source from whence the water was obtained for this purpose was generally so abundant as to render the hydrostatic pressure upon the discharging aperture nearly uniform. Such clocks being however unattainable, except in comparatively few situations, it became a desideratum in mechanics with the Egyptians, and other ancient nations, to modify clocks of the first-mentioned kind, so as to render them more accurate. In the first place, they had to make the lines of unequal distances apart, bringing them nearer together as the height of the column diminished; this regulation was, we presume, easily accomplished by reference to the sun dial, a measurer of time of still greater antiquity than the clepsydra; but then another difficulty arose of still greater magnitude. Among the Egyptians the *hours* of the day and night were always varying, one hour of the day being a twelfth part of the time between sun-rise and sun-set; and one hour of the night a twelfth part of the time between sun-set and sun-rise; therefore not only were the hours of the day and night different, but the hours of each succeeding day varied from the hours of the past. Notwithstanding this troublesome circumstance, the ingenuity of the Egyptian clock makers was sufficient to overcome the difficulties it presented.

Many contrivances were adopted, some by varying the aperture of discharge, and others by varying the scale. The latter requiring a very extended scale was not so convenient as the former, which needed only a nice adjustment of the aperture of discharge; this was effected by a very simple and ingenious arrangement by Ctesibius, of Alexandria, about 200 years prior to the Christian era.

We cannot devote space to describe this machine now, but we may at some future opportunity. Mr. Partington's model of a clepsydræ, is of a very simple, elegant, and perfect description, and forms a very useful and cheap substitute for our expensive modern clocks of wheel-work, and it is merely such as any person may easily make for himself.

The cut in the margin is a representation of the machine in section; *a* is a cylindrical tube to hold the water, and *b* a float of cork on the surface, through which is passed the shortest leg of a narrow syphon *c*, which is suspended by a silken cord over a wheel *d*, and to the other end of the cord is attached a weight which nearly counterbalances the weight of the syphon; near to the extremity of the longest leg of the syphon is fixed an index *f*, that points out upon a graduated scale the hour, which is according to the degree of depression of the float within the tube. It is obvious that the syphon being thus supported by the float, and gradually sinking with the water as it escapes at the lowest limb, will continue to act uniformly from the top to the bottom of the tube, and consequently become a very accurate measurer of time. The water falls into a receiver *g*, that forms the base or stand of the instrument. The form of the apparatus renders it capable of being made very ornamental, and its beautiful simplicity and correctness of action, highly convenient and useful. The water from *g* may be made to run back into the column, by opening a passage between them, and inclining the instrument. An alarum may easily be applied to it in various ways. It is a clock that you may do what you please with, without injury to it; set it back, or put it forward, by pouring in or taking out the water; and it is instantly set to the required point. A clock might thus be made to go for a day, a week, or a month, at very little expense; likewise be made to call the attention of the owner to the business he has to perform during that period; to shew him not only the hour, but the day of the month, and every kind of periodical information that almanacks, remembrancers, and pocket-books, contain; moreover the merest novice in mechanics may, with the utmost facility, make one to suit exactly his own particular vocation, taking this excellent model for its basis.—Even

> "London's proud column, which pointing to the skies,
> Lifts its tall head and like a bully lies,"

might be converted into a very useful machine, and be the means of affording *true* and valuable information to the *three* millions inhabitants of this metropolis, and at the same time form a grand illus-

tration in hydraulics, a science but little understood by many of the sleek citizens, if we may judge from some remarks recently made in the common council.

NEW PATENT METHOD OF APPLYING HEAT.

By Messrs. Beale & Porter, of the Commercial Road, London.—*Enrolled July* 19, 1828.

In the 26th number of this series we noticed a patent for this purpose, recently granted to Messrs. Beale and Porter, and we then expressed a hope of shortly laying before our readers a more detailed description of its advantages, and of the means whereby they are accomplished. We are happy in being able now to fulfil our promise.

The patentees have discovered, in the course of their experiments, that many fluid substances may be used as media for the communication of heat, at various degrees of temperature, suited to various operations in the arts and manufactures, so that one substance may be chosen as proper for some processes, and some other substance, or combination of substances, as more suited to other processes; the nature of these substances being such, that under the ordinary pressure of the atmosphere each will indicate a known and unvarying degree of temperature at its point of boiling, and may be made to communicate that same degree to bodies exposed to its action.

The substances proper to form media are too numerous for us to attempt giving any list; it may, however, sufficiently indicate their nature and properties, to name a few. Spirit of turpentine boils at 316° Fahrenheit, and gives off a dense vapour at that temperature, and is, therefore, well qualified for all purposes where that degree of heat will suffice. Naphtha, from its cheapness, will be chosen preferably to turpentine, as it boils and vaporizes at about the same degree. Naphthaline will answer where 400 degrees are required; and, by distilling coal tar, and collecting the products at different periods, various other bodies will be obtained, which will furnish different degrees of heat, ranging between 300 and 700 degrees of Fahrenheit.

From this description it will be evident that the maximum degree of heat will be always and altogether independent of accident, or want of skill, so that no injury from burning can possibly arise, except through the employment of an improper medium, which, as fluids may be chosen whose boiling points vary between the range of 200° and 700° Fahrenheit, need never occur.

The mode of applying this principle to boiling or distilling, is, by using a double vessel, having one part placed within the other, so as to leave a small intermediate space. Into this space the substance intended to form the medium must be introduced in sufficient quantity to cover the *flat* bottom of the outer vessel, to such a depth as to secure it from injury by means of the fire. When this fluid is made to boil, it will give off vapour of the same temperature, which, as it comes in contact with the surface of the inner vessel, will part with its heat thereto, and resuming the fluid form, will fall

again to the bottom of the vessel to be again vaporized, and so on in a constant alternation of evaporation and condensation. To keep up a communication between the fluid medium and the atmosphere, avoiding thereby all tendency to rupture or explosion, a tube, open at both ends, is introduced into the intermediate space between the vessels. Should there be gross mismanagement of the fire, some portion of the vapour would be forced up this tube; it is, therefore, made to pass through a condenser, the action of which will return the fluid to the double vessel, so that little or no waste of the fluid medium will be sustained.

This mode of boiling has been advantageously applied to the refining of sugar, a substance so peculiarly liable to injury from superfluous heat, that the most complex and expensive plans have been employed, in order to avoid the danger of burning. This end is unfailingly attained by Messrs. Beale & Porter's invention, as, indeed, must be evident from our previous description; while the means employed by them are at once safe, simple, and inexpensive. The advantages of their method are, however, not confined to this important particular, the sugar crystallizing with a particularly strong grain, and proving highly saccharine.

In the original manufacture of sugar from cane-juice by the usual method of boiling, about one third of the saccharine matter takes the form of molasses. Experiment has satisfactorily shewn that cane-juice does not (at least to any great extent) necessarily contain matter incapable of granulating; molasses being principally, if not altogether, the effect of improper boiling. The loss thus occasioned is three-fold. First, in the diminished value of the uncrystallizable portion: next, in the injury which the molasses imparts to the colour of the crystallized sugar: and, thirdly, in the quantity which drains from the cask during the voyage to Europe. Our West India friends will readily appreciate the value of a discovery which enables them to avoid these evils.

Many of the foregoing remarks will serve to point out the advantages of this patent to distillers, who will now be able to apply exactly the degrees of heat most proper for their purposes in the different operations conducted by them. Not only will they be free from all liability to burning the contents of the still, however delicate in their nature, but all production of empyreuma will be avoided. The invention may be used in conjunction with any other improved method of distillation.

To manufacturing chemists the advantages will be very evident and most important; the medicinal qualities of their production depending, mainly, upon the degree of heat to which they are subjected; which, as it is constantly varying, so the qualities of the drugs also vary, and thence results a most unfortunate difference in their effect. Some specimens of vegetable extracts, made with the patent apparatus, and which we have seen, sufficiently attest the correctness of these remarks.

Dyers and calico printers will readily embrace the means, thus afforded, of avoiding the hazard and uncertainty attendant upon their processes in the preparation of colours. Tallow and wax

melters and refiners may also benefit by so certain a mode of regulating heat, in preserving the colour of their goods.

In the southern whale fishery, when the ship falls in with a flock of whales, the blubber is boiled on board, in the midst of hurry and confusion, and it is most difficult to avoid injury from burning, which frequently occasions a difference in the value of the oil, amounting to many pounds per tun. The Greenland fishery is differently conducted, the blubber being boiled on shore: but here a very serious detriment is, notwithstanding, experienced, by burning the mucilaginous and feculent matter, and, consequently, injuring the colour of the oil, and producing empyreuma. The process, if carried on under this plan, would not be liable to these disadvantages, and it is probable, that oil so prepared might be used for various processes in the arts, for which it is at present wholly unfitted.

There is, in fact, hardly a process in manufactures where heat is applied to animal or vegetable substances, that may not be benefitted by this invention; which realizes all the advantages of high-pressure steam, without its attendant danger and complexity; and is available for temperatures, at which it has never yet been attempted to use steam heat.

One principal object which the patentees are stated to have in view, is the *safe* generation of high pressure steam, which object they attain with peculiar advantages, as partly detailed in our former notice of their patent. The vessel wherein steam is generated being altogether withdrawn from contact with the fire, is not liable to injury, and as it is manifestly impossible to impart a higher degree of heat to the generator than the boiling point of the fluid employed as the medium, the steam can never be surcharged with heat, so as to injure the piston or cylinder of the engine. The densities at which steam may thus be safely raised and applied afford the means of realizing a very important economy in the consumption of coals. The patentees have had a steam engine usefully and satisfactorily employed for more than six months, which we have had opportunities of seeing, and are therefore enabled to speak, with unusual confidence, as regards every one of the benefits described by us. In an early number we hope to give the result of some comparative experiments made with their apparatus.

The entire safety which attends this process in the raising and using of high-pressure steam, must tend greatly to extend the employment of steam power. For loco-motive carriages and for navigation this property is invaluable; and as the invention likewise combines lightness and compendiousness with the most important economy in fuel, and admits of the employment of engines upon the simplest principle, it appears calculated essentially to promote these interesting and highly important objects.

STEENSTRUP'S PATENT PADDLE WHEELS.

[We readily give insertion to the following letter from Mr. Steenstrup, as it contains additional observations by the patentee on his invention. The *only* error which he points out, is that of the

position of one of the wood cuts, fig. 2, which our printer by mistake inverted in fixing up the form, and part of the impression was struck off before the error was discovered. The letters of reference will shew the position in which it ought to have been placed.]

TO THE EDITOR.

3, *Basing Lane.*

SIR.—In the description of my improved paddle-wheel, given in the last Number of your valuable journal, I observe the following errors, which I beg you will do me the favour of correcting by inserting this letter in your next:—

1. Fig. 2 of the prefixed diagrams is very inaccurate, and by adding a complication to it represents a construction *counteracting* the regulation of the paddles, which are also represented in a *wrong position*, as they ought to be similarly placed as those of fig. 1.

2. You are perfectly correct in observing, "that the paddles entering the water should have a certain obliquity, varying as the paddle advances in its revolution," and I must add, that the paddles of my wheel follow this rule in the most proper and perfect manner. But, you further remark, that "the patentee observes, that, as every part of the periphery of the wheel must describe a cycloid, (I have said a *compressed* cycloid,) the paddles should at every part of their revolution form tangents to that curve," whereas, my observation is, that a paddle will always in that moment it moves in the same direction as the vessel, form a tangent to that curve, and it will increase the angle to that curved line, as its propelling power increases, until it has proceeded to the opposite point in the circle of revolution, where it will always form a right angle to the tangent to the wheel, and to that curve. From thence a paddle will again gradually diminish this angle, as its propelling power decreases, until it will again on the before mentioned place form a tangent to the said curve and to the wheel itself.

By the diagram accompanying my specification this is shewn to be not *nearly* but *exactly* the case.

I am, Sir, yours, &c.
P. STEENSTRUP.

August 12, 1828.

STEVENS'S PATENT PADDLE WHEELS.

THE following letter contains matter which we have deemed of sufficient importance to entitle it to a place in the Register; but the writer will perceive that Mr. J. L. Stevens claims as an *advantage* the *oblique* position of the paddles while rising out of the water, for he states that he makes due allowance for the impetus of the vessel.

TO THE EDITOR.

SIR,—I observe in your 38th Number of the Register of Arts a new invented paddle wheel, and which seems to me similar to

one which has been not only previously invented, but described and published four years since in the Glasgow Mechanics' Magazine, vol. ii. page 50. This waste of money in a patent right can only be attributed to the patentee not reading the work in question, or submitting his invention to men fully qualified to judge of its merits or originality; in fact, upon a comparison of the two inventions, I have not a doubt you will at once see the other is the preferable of the two, as the paddles must always enter, pass through, and rise out of the water perpendicular to its surface, which is not the case with the present assumed invention. As to its application as a substitute for undershot water wheels, I think, Mr. Editor, you will, upon the slightest inspection, at once see its complete ineffectiveness. I think it never could have above ½ of the usual power under similar circumstances as to fall, &c. Besides it has only one set of paddles, or an equal section of two sets acting at once, and that only one-third of the breadth of the wheel; subject to extra wear and tear, and less stability, which is so essential a property of all powerful first movers, which can be attested by every practical mechanic engaged in the erection of hydraulic machinery.

Owing to the invention having been published prior to this patent, one would very naturally suppose it to be the property of the public, and not to be made the undue monopoly of any one, as far as regards its *application to steam vessels*, for which it appears admirably adapted, if no practical difficulty occurs in the manufacture of the cranks, as they would have to be of immense strength as to dimension and length of stroke, so as to be capable of transmitting the power in some packets of at least 80 or 90 horse power. If you think the above remarks worthy a place in your widely circulated and scientific miscellany, they are at your service.

I am, your obedient servant,

A YOUNG ENGINEER.

Malton, Yorkshire, August 12th, 1828.

MISCELLANEOUS INTELLIGENCE.

ACIDS IN THE STOMACH.—In a recent communication to the Royal Society on the subject of the formation of acid in the stomach of animals, fed on various kinds of food, natural and unnatural to their ordinary habits, Dr. Prout found that in every instance the acid produced was the muriatic, and no other in any appreciable quantity, at least when the stomach is in a state of health. In a diseased state, however, the human stomach seems to secrete or produce the acetic acid, according to Dr. Prout.

ORGANIC REMAINS.—Notwithstanding that the antiquity of the volcanic eruptions which formed the mountainous district round Clermont, in the south-east of France, is so remote as to be antecedent to history, yet the tufa and volcanic ashes contain an immense variety of the bones of animals, both of the quadruped class as well

as birds. M. Cuvier describes many of these remains as new or extinct species of the mastodon, elephant, hippopotamus, &c.

THEORY OF VISION.—A paper was recently read before a sitting of the Royal Academy, by M. Majendie, in which he contends that the ordinary opinion is incorrect with regard to the sense of vision depending on the optic nerve. According to some experiments of this eminent physiologist, when the optic nerve has been obliterated by a tumour, still the function of vision was almost as perfect as in ordinary cases.—*London Weekly Review.*

EXTENT OF VOLCANIC INFLUENCE.—The grand eruption of Tomboroo, in the Island of Lambawa, near Java, is described by the late Sir Stamford Raffles, as extending over the circumference of at least a thousand statute miles from its centre. At Java, three hundred miles distant, the eruption seemed to be in the immediate vicinity, and produced the most dreadful alarm; the sky was overcast at noon with clouds of ashes, which covered the houses and streets to a considerable depth, and at the same time the most tremendous explosions were heard at intervals, like the report of heavy artillery in the vicinity of Java.—*Ibid.*

THE COW CABBAGE.—This plant attains in La Vendée the height of from twelve to upwards of sixteen feet. Sixty plants are sufficient provender for one cow for a year; and they last four years without replenishing.—*Ibid.*

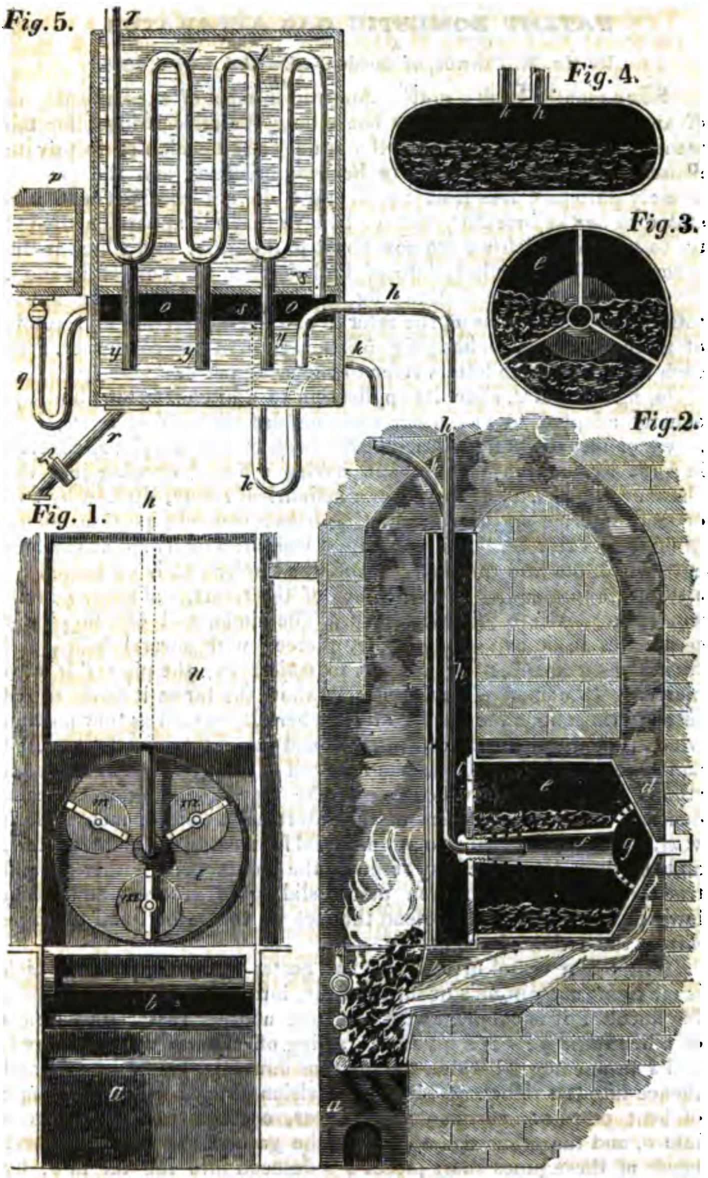
BALLOONS.—Mr. Brawn, the Professor of the German language in the Polytechnic School at Paris, has addressed a letter to the French Government, accompanied with a plan of an äerostatic machine capable of receiving any wished-for direction. The letter and plan have been referred to the Academy of Sciences; and the Academy has appointed a commission to inquire into the merits of the invention.

VELOCITY OF CANNON BALLS.—Lieut. Helwig, of Prussia, has invented a process for measuring the time occupied by a ball or bullet in passing through a certain space. His process consists in making the ball liberate the works of a time-keeper at the moment when it strikes an object. The numerous experiments which he has made already, offer interesting results. He finds, for instance, that a light body of the same calibre as the bullet, moves at the commencement with much greater velocity than the latter, equal charges being used; he finds also that small bodies move much more promptly; a circumstance which causes a considerable deviation of the ball, when there is sand or any light body with the piece used.—*Bulletin Universel.*

TO OUR READERS AND CORRESPONDENTS.

A Yorkshire Engineer has our best thanks for his kind offer, but we have by us a drawing and a description of the apparatus alluded to.

In our next Number we shall give the particulars of some interesting experiments made by Mr. Hemming, in his late aërostatic ascent with Mr. Green, together with an analysis of the air collected at different altitudes; and some experiments on a mode of obtaining a much lighter gas than that now employed, on a more economical plan.



PATENT DOMESTIC GAS APPARATUS.

PATENT DOMESTIC GAS APPARATUS,

By Mr. H. Pinkus, of London.—*Enrolled August*, 1828.

Some months back a notice appeared in most of the daily papers of an invention exhibiting at a house near Waterloo Bridge, for the manufacture of gas on so small a scale, as to be adapted to private houses. The light was said to be very brilliant, and the gas extremely pure and free from smell. We do not recollect who was stated to be the inventor, but we believe that the apparatus alluded to, to be that which we are now about to describe, and which is the invention of Mr. Pinkus, late of Philadelphia, but now of London.

Fig. 1 is a front elevation; fig. 2 a lateral section of the apparatus; fig. 3 a section of the retort; and fig. 4 a section of a retort of a different construction; fig. 5 is a section of the condenser. In each figure the same letters refer to the same parts.

a, figs. 1 and 2, shew its application to a kitchen range, but it is equally adapted to any other common fire place; *b b*, fig. 2, is a recess or furnace built in brick at the back of the fire place, covered in front by an iron plate *c*, and having a flue *d* opening into the chimney: *e*, figs. 1, 2, and 3, is a cylindrical retort, divided by two or more internal partitions, radiating from a conical pipe *f*, as shewn in fig. 3. The retort is turned with a small rim or flange at the fore end, which fits into the plate *c*, and the hinder end is supported by a stout pin, projecting from the back of the retort, and resting in an iron socket let into the brick work. The hinder end of the pipe *f* terminates in a cup or cavity *g*, pierced with several holes, and serving as a chamber for the gas to collect in; the pipe *f* is also pierced with numerous small holes to allow the tar as it forms to fall through them upon the burning fuel, where it, as well as that portion which runs down the conical pipe *f*, and the cup *g*, is decomposed and converted into gas. In the fore end of the pipe *f* is screwed a stuffing box, through which passes the pipe *h* leading to the condenser. Each compartment of the retort has a door or mouth-piece *m m*, by which the coal or other material for making gas is introduced, and the door is secured by screws, the joints being either ground true or luted: *n* is an iron plate, sliding in grooves, and when lowered down serving to defend the face of the retort, and the pipe *h* from the action of the fire.

Fig. 5 is a vessel divided into two parts, the lower part *o*, which is air tight, containing a quantity of tar, into which the pipe *h* dips a few inches; it is supplied with tar from another vessel *p* by means of a bent pipe *q*; *r* is a pipe for drawing off the tar when required, and *s* an opening by which the tar runs down the pipe *k* into *h*, and thence into the retort. The upper division of fig. 5 contains a range of bent pipes *t t*, surrounded by water, one end *v* of which opens into *o*, and the other end *x* leads to the gasometer; from the lower bends of these pipes short pieces *y y* descend into the tar in *o*, by which means the tar condensed in the pipes *t t* descends into *o*, whilst the gas cannot escape through the short pipes.

The operation is as follows: the retort being charged and the doors secured, the retort is turned till the chambers are in the position shewn in figs. 1 and 3; the shutter *n* is then let down, and the fire lighted; a portion of the heat and flame from which passes through an aperture in the back of the range (shewn by the black space between the bars in fig. 1) into the furnace *b*, causing in a short time the lower part of the retort to become red hot, and the coals or other materials in the interior to give out gas, which collecting in the chamber *g*, passes through the pipes *f* and *h* to the condenser; at the same time the tar given out by the coals in the upper chambers of the retort descends through *f* and *g* on to the burning fuel in the lower chamber, and becomes decomposed. When it is supposed that the materials in the lower compartment have given out all the gas contained in them, the retort is turned partly round, so as to bring another compartment immediately over the flame, when the gas is again given out as before. The gas thus formed contains tar and other impurities; from some of which it can be freed by a reduction of temperature; the pipe *h* is therefore made to dip a few inches into the tar vessel *o*, and through this tar the gas has to rise to enter the condenser; by which means it is divested of a portion of its impurities, and upon entering the condenser it passes through a great length of pipe surrounded by cold water, when all the *condensible* impurities are separated, and descend into the tar vessel by the pipes *y y*. The tar, as we have before stated, returns to the retort by the pipes *k* and *h*, and is decomposed by falling on the burning coke in the retort.

From the condenser the patentee states the gas is to pass into the gasometer, without pointing out the steps by which it is to be purified from the various noxious gases with which it is still combined, or without even hinting that such purification is necessary; this is the more extraordinary, as Mr. Pinkus, the patentee, is also patentee for an apparatus expressly constructed for the purification of gas. No private family could possibly use the gas in the state in which it exists in the gasometer, when prepared according to the directions here given; we therefore think it a great oversight in the patentee not to have described some compact and simple apparatus for purifying it, even though it should have nothing peculiar to entitle him to an exclusive right to the same.

Fig. 4 merely represents an oblong retort, which may be substituted for the one before described, when the length of the fire place will admit of it; it will then, of course, be fixed, instead of turning upon a pivot, and the gas will pass off by the pipe *h*, and the tar return by *k*, inserted in the top of the retort.

BURT'S PATENT STEAM ENGINES.

Enrolled August, 1828.

This *valuable improvement* is a communication from *a foreigner*, and consists in suspending the cylinder upon arms or trunnions, so as to vibrate with the piston rod passing through the lower end of

the cylinder, and connected directly with the crank of the fly wheel. But although vibrating cylinders may be a novelty on the continent, they are by no means new in England, and from their being little used, we may fairly conclude that they possess few advantages. The patentee indeed suspends his engine so that the piston rod may proceed from the lower, instead of the upper end of the cylinder, which is the common method, but the superiority of this method is not very apparent, and we fear that the *communication from a foreigner* will prove a dear gift to the patentee.

STOKES'S PATENT FOR MANUFACTURING SUGAR.

Enrolled August, 1828.

From the extent and importance of the manufacture of sugar, many scientific and practical men have made it the subject of their study and experiment; numerous patents have likewise been taken out with the same object. The process has in consequence been a good deal facilitated, and the quality of the product improved; but from various circumstances there is every probability of the former being rendered much more economical, and the latter further ameliorated. A perusal of the present patentee's specification has not, we are sorry to say, discovered to us any thing very novel, as other processes very nearly approximating to it have long since been patented and practised; the substance is as follows.

The cane-juice is to be mixed with 14 lbs. of charcoal, 7 lbs. of bark of the wild elm tree, and 1 lb. of lime. After standing some time, the juice is to be filtered through blankets, and then removed to the boiling pan, where it is to be concentrated until it will take the granulated form; after this it is to be poured into boxes, or potted in earthen moulds. Before packing the sugar in hogsheads, it is to be mixed with common spirit, either brandy, rum, or geneva, in the proportion of one gallon per hundred weight. In this moistened state it is submitted in proper boxes to the action of a hydrostatic or other press, by which means the moisture is expelled, and the quality and colour of the sugar much improved.

Bastard sugar, the patentee says, may be treated in the same way as the cane juice: he likewise states, that his patent right is not limited to the before mentioned proportions, which he, however, finds to be the best; but it is a singular circumstance, that he has omitted to give in his specification the proportion of cane juice or bastards to the stated quantities of the clarifying materials, charcoal, bark, and lime. The patentee has also very unadvisedly claimed the exclusive right of employing "*all similar chemical agents.*"

Mr. Stokes is, unfortunately for him, not a reader of our work, (which all patentees elect should make it their business to read or look over, at least); had he been, he would have seen that not only similar, but some of the very agents had been previously employed. In one of our early numbers is Mr. Jenning's patent, wherein is claimed the employment of *alcohol* for clarifying sugar, on account of its

great affinity to colouring matter; but Mr. Stokes, it is true, uses this agent in its *impure* state, combined with *colouring* matter, and essential oils, which must of course render it *less* effective. Charcoal and lime have been employed before for the purpose, but we cannot at this moment conveniently make reference to the particular specifications; our readers will, however, meet with them in some of our early numbers.

ON PADDLE WHEELS.

So many papers have been inserted in our present and recent Numbers about *paddles*, that we are fearful some of our readers who are not absolutely addicted to this department of mechanics, may consider us too partial to the subject. That such is not the case, however, will appear when we remind them, that facility of communication from place to place, has been uniformly considered by the enlightened of all nations, as the first grand step to civilization, and that in proportion as good roads, canals, railways, steam boats, carriages, &c. have increased, commerce and population have been augmented, the condition of the people has been ameliorated, and all that is useful or elegant has been improved, and multiplied. Steam navigation, the greatest triumph of modern art, to which the wind and the waves are made subservient, and which can be conducted upon a system of better economy than any other, is calculated to effect greater salutary changes in the present state of things, than any other plan of locomotion hitherto proposed. (We except Mr. Vallance's interesting scheme for sailing on land through tunnels, by a wind artificially raised, which we always have regarded very favourably, and as being practicable.) Whatever improvement therefore can be effected in the construction of steam vessels, ought to be looked upon as a national advantage, and from the peculiar nature of the machinery, it is one of the utmost interest to the mechanical reader.

It is admitted on all hands, that a great loss of power is sustained by the ordinary paddles, and that they are highly inconvenient, and liable to accidental injury. To obviate these defects, without substituting others of equal or greater magnitude, is an object which numerous ingenious men are striving to obtain, and we are anxious that the Register of Arts shall become a correct medium for conveying their inventions and discoveries to each other, and to the public at large. We earnestly invite the contributions of intelligent men in the investigation of this important matter, and we are happy in having it now in our power to present our readers with a very able paper from Mr. E. Galloway on the subject, which we trust will be followed by others of equal interest and talent. We also add in the present Number, letters from Mr. Stevens, and Mr. Downing, which we could not with propriety defer; we have no less than nine letters on the same subject; but the observations of Nauticus, W. H. and W. Nicholson are, they will perceive, anticipated in the subjoined papers.

ON PADDLE WHEELS,

By Mr. E. Galloway, Author of the History of the Steam Engine.

London, August 19, 1828.

Dear Sir,—I had been for some time making experiments on paddle wheels, in order, if possible, to find out some method of dispensing with the present disadvantages of oblique action, and the resistance occasioned by back water; and I must confess that the difficulties which surrounded me on every side, had led me to despair of their ever being overcome, until I saw the ingenious plan of Mr. John Lee Stevens, of Plymouth, author of a volume of Poems entitled "Fancy's Wreath," the perusal of which have given me much pleasure. Without stopping to notice the happy and novel conformation of that mind which can successfully direct its energies to the useful as well as the pleasing studies of life, I beg to state, that Mr. Stevens's plan has completely set at rest my doubts on this important subject.

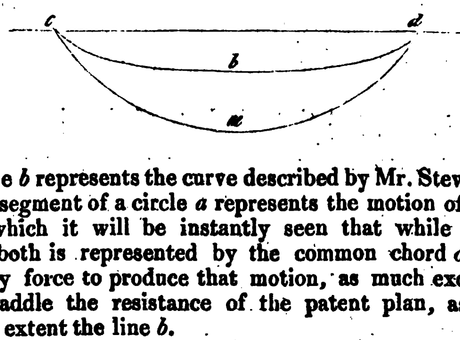
The principal objection which exists against the common paddle wheel, is, that the effect produced, is only equal to the chord of the segment immersed in the water, whilst the force necessary to press upon the fluid is continued to the length of the segment itself, and therefore that the force expended in unnecessary resistance, is as much too great, as the length of a segment exceeds its chord. The only point therefore in which a paddle wheel on the common principle is acting with its full effect, is at the lowest point of its revolution when its motion approximates to a horizontal one, and consequently describes a line nearly parallel to that of the vessel.

But the evil does not stop here. The power thus uselessly expended, produces another objection of scarcely less magnitude than that of oblique action; for as the paddle rises out of the water, it assumes such an angle as to raise with it a considerable quantity of water technically called "back water," and this in such quantities that small boats which have accidentally come behind the paddles have been known to be filled and sunk in a few seconds, by the back water thus thrown up. This has not only been a considerable deduction from the effect of the paddles, but has hitherto been a bar to the application of steam to canal navigation, owing to the violent action of the water thus agitated upon the banks of the canal by which they become speedily washed down. I need not observe that any improvement which could be devised to enable us to dispense with the present tedious and expensive mode of transit by canals, would be of the first importance to the country.

The method which first strikes an inexperienced mechanician as most likely to obviate these objections, is that of causing the paddle to retain a vertical position during the whole of the revolution; from the presumption that if the common paddle wheel only acts with its full effect, when in its vertical position, then a paddle *always vertical* would be equally effective throughout, forgetting that the reason of the superior effect of the common paddle at that point, does not arise from its perpendicularity, but from its motion then

being nearer to a parallel with the motion of the vessel than at any other point. And though the back water may be decreased by a paddle always vertical, yet another evil is engendered of still greater magnitude, which is, that such paddle is nearer to a state of rest, as it rises out of the water, and therefore would, just before leaving it, become slower in its movement than the vessel itself, and, consequently impede instead of aid its propulsion.

A paddle therefore which should possess the advantages of travelling through a less space in the water, by approaching nearer to a right line, (the most effective movement of any) and at the same time travel during the whole period of its immersion, at a speed exceeding the vessel, without becoming of a larger diameter than the wheels (already too cumbersome) in present use, seemed to be the only one which promised to supersede the old plan, and in my opinion, Mr. Stevens's patent principle, described in Number 38, of your valuable publication, fully effects these objects. For there, by the happy arrangement of his guiding and radius rods, his paddles are made to describe in the water a segment of an elongated ellipse, and at the same time to assume such an inclination as at all points to exceed considerably the greatest speed of the vessel, thus combining the advantages of a vertical paddle to the greatest extent that it may be carried without the impediment above complained of, and at the same time, approximating very nearly in its motion to a parallel line. I need scarcely dilate on the benefit to be derived from the decrease of distance which the paddle must travel in the water to produce a given effect compared to the distance which the common paddle travels during its immersion.



The line *b* represents the curve described by Mr. Stevens's paddle, whilst the segment of a circle *a* represents the motion of the present one, by which it will be instantly seen that while the effective action of both is represented by the common chord *c d*, that the unnecessary force to produce that motion, as much exceeds in the common paddle the resistance of the patent plan, as the line *a* exceeds in extent the line *b*.

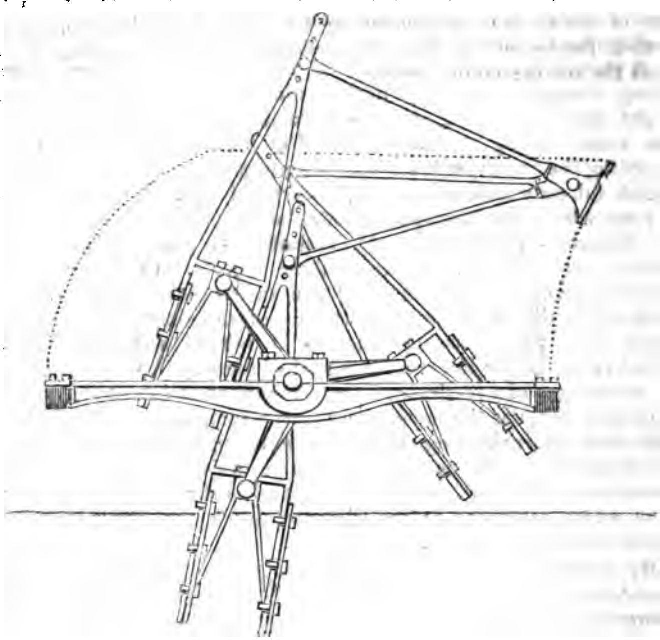
The nearly vertical motion dispenses with most of the back water as a matter of course.

The axis of the largest engines may be brought lower in the boat by which the bounds of the paddle case is much contracted, and the necessity of carrying the machinery to the present elevation is dispensed with, by which the vessel is not so liable to be top heavy, or as it is technically called, *crank*.

Another highly important advantage arises from the depth to which these paddles may be immersed, so that they may be made

to act on a denser and less yielding medium, and consequently on a fluid approaching nearer in its nature to a stationary fulcrum.

The stroke may be made of double the length of that of a common paddle enclosed in a paddle case of similar dimensions.



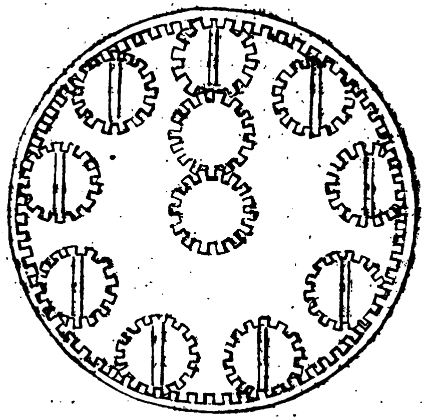
I beg to be understood that this detail of the advantages of Mr. Stevens's paddle refers to the accompanying modification of two paddles on each division of the crank, by which I conceive the whole is considerably stronger than the modification represented in your former figure, and further that the area of surface immersed in the water will be at all points of the revolution nearly the same, because there is at any one point, either one pair of paddles completely immersed, or sections of two pair equal to one.

I have not yet noticed that all the other plans by which an independent motion is given to the paddle, have been liable to the objection of a constant risk of breakage by a heavy sea, or even by their own rapid action, owing to their great complexity, and from the *unmechanical* combination of chains and cog wheels which are at all times bad; but in this instance, particularly so, from the great violence to which they are subjected, and the difficulty of repairing them when most required.

I perceive in your 40th Number that you have given a description of a paddle wheel assumed to be the invention of Mr. P. Steenstrup, which I think is liable to all the objections of complexity, and to the

majority of these against the common paddle. The idea suggested by the patentee of total immersion of a wheel, presenting the whole surface of the greater portion of the paddles to the medium through which they pass, requires no comment.

Its novelty, too, as a subject for a patent I have to dispute. The mode of giving the independent motion of each paddle being described in Buchanan's work on Steam Boats, from which work I have copied the accompanying outline.



By comparison it will be seen that Mr. S.'s method of causing the paddles to revolve is not new, and though his paddles merely perform a semi-revolution, that action was made the subject of a patent by Mr. John Oldham, in February, 1827, so that neither the mode of producing the action of the paddle, nor the position they assume in the water, are new.

The detail of the experiments stated to have been tried by the patentee amount to nothing, inasmuch as we are not informed whether it required more or less force to produce a revolution.

I am, dear Sir, very truly yours,

E. GALLOWAY.

P. S. Since the above was written I have seen an article from "A *young* Engineer," doubting the originality of Mr. Stevens's invention, and referring to a description of a method proposed by a Mr. Clark in the Glasgow Mechanics' Magazine. The youth, I find, immediately contradicts himself, by telling you that the action of the two plans are *different*; Mr. Clark's acting vertically in the water. I need not state that the only resemblance between the two is in the application of a three-throw crank.

ON STEVENS'S METHOD OF PROPELLING VESSELS.

By the Patentee.

TO THE EDITOR.

SIR,—On reading the letter of "A young Engineer" in your last number, I imagined that, by possibility, there *might* be some plausibility in his remarks on the similitude between my invention and the one to which he alludes, (although, *within twelve lines*, he refutes his own position) as two persons, whose means and intentions are mutually unknown, may arrive at the same method of producing a required effect; but, on a reference to vol. ii, page 50, of the Glasgow Mechanics' Magazine, I found, not only such a variance in the apparatus as would lead the most unskilful mechanist to reject the hastily formed opinion of your correspondent, but, that the application of the paddles (as I suspected) was conclusively different; those of Mr. Clark forming in the water *a segment of a circle*, whilst mine describe *that of an ellipse—the peculiar advantages of the latter* will be very soon demonstrated to those who cannot understand the adaptation and power of machinery unless they see it in action.

I have no wish, Sir, to occupy your pages with such reflections as the presumptive tone of your anonymous correspondent would obviously suggest, and, therefore, desire to inform him, that I should feel a pleasure in replying to any tangible objections he may foward to my address, *provided they bear his proper signature*, and are conceived with better feeling.

Mr. Editor, I remain your obliged humble servant,

J. L. STEVENS.

Johnson's Coffee House, St. Clement's, Strand,
25th August, 1828.

ON STEENSTRUP'S PATENT PADDLE WHEELS.

By MR. SAMUEL DOWNING.

TO THE EDITOR.

SIR,—On reading your account of Mr. Steenstrup's invention of machinery for propelling, N°. 40, page 242, I was struck by a remarkable coincidence. Although, in the course of events, it might be possible that Mr. Steenstrup received a hint, coming originally from me, I think it scarcely probable that it could be so. That gentleman and I have certainly invented the same identical machinery, although our ideas as to its application appear to vary a little. He, however, is the more fortunate of the two in having been the first to secure his patent, and to lay it before the public: all that I can do now, is to wish him success, as I think it a valuable invention. His arrangement of the wheels does not exactly coincide with mine; and, I think, with deference, mine is somewhat superior. This is but a trifle; the ingenuity he has already displayed in contriving the motion, and proving its action, leave no room to doubt he will bring it to perfection. The movement, according to fig. 1 of your diagram, will be correct; but that according to fig. 2, Mr. Steenstrup

will at once see, will be contrary to the required direction. Your 40th No. did not reach me till yesterday, or I should have made my communication sooner. No part of the periphery will describe an exact cycloid during the vessel's motion in the water, but a curve, varying between a circle and a cycloid.

I am, Sir, yours, &c.

20, James Street, Lambeth Marsh, SAMUEL DOWNING.
August 23, 1828.

P. S. I perceive Mr. Steenstrup has already corrected your error.
S. D.

NEW APPLICATION OF HEAT.

IN our description of Messrs. Beale & Porter's patent, inserted in the last number of the Register, we omitted to call the attention of our readers to one of its most important advantages, that of its great economy in the consumption of fuel.

In the various apparatus hitherto constructed by them, this economy has been realized to a most extraordinary extent; amounting, in all cases, to a saving of more than one half, and in some, to as much as two thirds of the coal previously used to produce similar results.

This saving appears to arise from the peculiar nature of the substances used in communicating heat, which take up caloric with greater rapidity than most other substances, and part with it again as freely; so that the absorption of heat from the furnace, being in greater proportion to the quantum evolved than is usually the case, less passes off uselessly into the chimney.

This circumstance alone must render this invention highly interesting to the manufacturer, who, in these days of competition, and, consequently, of diminished profits, must depend upon superior excellence in his productions to command a market, and must look to economy in his operations in order to render his labours profitable.

SPECIFICATIONS OF TWO AMERICAN PATENTS FOR MAKING PAPER,

By WILLIAM MAGAW, of Meadville, Pennsylvania.

The first dated March 8th—the second 22nd May, 1828.

TAKE any quantity of straw, and boil it in water with salts of ley, pot or pearl ashes, in the following proportions. To one hundred and fifteen pounds of straw, add from fifteen to twenty pounds of the salts of ley, and boil it about thirty minutes; then draw off the water, and put the straw into a common paper engine to be manufactured like rags into paper.

WILLIAM MAGAW.

The improvement of discovery consists in preparing straw, hay, or other vegetable substances for the manufacturer of paper in the following manner. Take any quantity of straw, hay, or other vegetable substances, and boil it in a solution of salts of ley, pot, or pearl

ash, or other alkali, or lime, in the following proportions, viz. To one hundred and fifteen pounds of straw, hay, or other vegetable substance, add from fifteen to twenty pounds of salts of ley, pot, or pearl ash, or other alkali, or lime, and boil them about thirty minutes, or steep the materials in the solution a few days, or until saturated; then draw off the water, and put them into a common engine, to be manufactured into paper like rags.

The discoverer claims as his exclusive improvement or discovery, the materials, and the mode of preparing the straw, hay, or other vegetable substances, so as to render them fit for the manufacture of paper.—*Franklin Journ.* William Magaw.

SPECIFICATION OF AN

AMERICAN PATENT FOR EXTRACTING TANNIN FROM BARK.

By Joseph Giles, of Guildford, Vermont.—Dated April 11, 1827.

This lixivium, or tanning principle, is obtained by soaking and digesting the proper materials, such as fine ground oak or hemlock bark, &c. in an apparatus designed particularly for the purpose: that is to say, I take twelve leaches or vats, of any convenient capacity, each filled with ground bark, and so placed as to draw by a cock with suitable convenience from each of the twelve leaches into one common receiver; I then place one cistern above the leaches, so as to draw from said cistern into all the twelve leaches. Into this said upper cistern I have a common engine for generating steam, operating so as to heat the liquor therein to a boiling heat; which liquor thus heated I draw upon and fill the first of the said twelve leaches. I take care in filling the leaches with ground bark that it be loose and be not crowded, but so that the liquor will freely fill the whole leach, and become saturated with the tanning principle of the bark; after thus lying upon the bark, and soaking it a convenient time, I draw it from the leach into the receiver; I then pump it from the receiver back to the cistern, and heat it again with the steam engine as before; then I draw the liquor upon the second leach, and while it is soaking there I heat water or weak liquor drawn from the leach after the first process, and draw the same from the cistern upon the first leach; I then draw the strong liquor from the second leach into the receiver, and from thence pump it again into the cistern; I again heat it as before, and then draw it upon the third leach, and so continue the liquor—repeating the process through the whole twelve leaches, following on with the second and third, and sometimes fourth addition to the first leach—taking care that none of the weak liquor or subsequent runnings become mixed with the first running and strong lixivium. As often as the tanning principle becomes entirely exhausted from the leach in any of the leaches, throw away the leach and fill with fresh. By continuing this process I reduce the entire tanning principle and strength of three, and even four cords of the best bark into one hogshead of tanning lixivium. I then add two pounds of saltpetre, and one

pound of common salt to each hogshead of my lixivium, and bung it up, air-tight, for use.

One hogshead of this lixivium will in three days time sufficiently tan five dozen of calf skins, and heavy skins and hides in the same proportion. In addition to the great saving of time and labour of workmen produced by the use of this powerful lixivium, the leather will be more completely tanned, will weigh heavier, will be more solid and close, and be less subject to be soaked with water and grow spongy than leather tanned in the ordinary manner.

This lixivium may also be usefully applied to cables, to all sorts of ropes, sails, canvass, and the tackle of ships made from hemp or flax: charged and impregnated with this principle, they will support a greater weight, obtain a greater strength, will wear longer and smoother than the common tanned rope or cable. It may be transported to all parts of the United States in a perfect state of preservation, and be at all times ready for use, either for tanning, or other purposes, and thus supersede the use of bark in the ordinary way.

Franklin Journal. JOSEPH GILES.

SPECIFICATION OF AN AMERICAN PATENT FOR PRESSING OIL FROM CASTOR BEANS,

By TIMOTHY PHARO, of Tuckerton, New Jersey.

A KILN built of bricks, about five by six feet square, and four feet six inches high, is to be erected, and to be covered with tin or sheet iron, supported by small iron bars across the top. A wooden frame, from four to six inches deep, is placed on the edges of the top of the kiln, to confine the beans on the tin floor while warming. A large sized iron stove is to be enclosed in the kiln, with the stove door on a line with one end of the kiln, for the purpose of keeping up the fire to raise the proper heat. At the opposite end of the kiln a small iron door is hung, for the purpose of opening and shutting occasionally to graduate the heat.

When preparing to press the oil from the beans, the beans are to be placed upon the tin or sheet iron floor above described, where, by means of the heat raised by the fire kept up in the stove, the beans are warmed to any degree the manufacturer deems proper, and are thence removed into the iron churn to be pressed with an iron screw, propelled by horse, steam, or water power.

The above described process of procuring the oil from the beans is new and to be preferred; because,

1st. The beans are more expeditiously warmed, and saves the expense of the labour of one hand.

2nd. All danger of scorching them is avoided, and thereby the oil is saved from any disagreeable taste, and procured in the utmost purity.

3rd. The beans can be properly warmed and dried for pressing, even when in a damp state, which cannot be done by a cylinder.

Ibid. TIMOTHY PHARO.

AEROSTATIC EXPERIMENTS,

By Mr. Hemming.

We have been favoured by Mr. Hemming, lecturer at the London Mechanics' Institution, with the following particulars of his last aërial voyage with Mr. Green, Jun., many of which are highly interesting, and have not heretofore been published.

Before entering the car Mr. Hemming, by adapting the vernier to an excellent mountain barometer, found the mercury steady at 29,91; and the thermometer at 74° Fahr. in the sun. At twenty minutes past six the balloon was liberated, and in five minutes after the barometer stood at 27.5. Its altitude varied but little during the next ten minutes, the gradual expansion of the gas only occasioning a slow and pleasant ascent. During this time the grappling iron was attached to the rope and lowered, the barometer was suspended in an upright and steady position, and two delicate thermometers with an accurate stop-watch attached to the hoop above the car; preparations were then made for experiment and observation, and Mr. Hemming had provided instruments purposely for the occasion. A small deal box partly filled with saw-dust, contained the apparatus for boiling the alcohol, bottles for collecting air, &c. A smooth and polished metallic vessel was then imbedded in the saw-dust, and nearly filled with equal parts of concentrated sulphuric acid and water, in which was immersed a thin tube containing about a fluid ounce of alcohol. The non-conducting powers of the saw-dust, the slight radiation of caloric from the polished metal, and the easy transmission through the tin tube, ensured an economy of heat which was highly necessary, as the thermometer fell rapidly during the ascent, and when the first portion of alcohol was boiled, stood at 32½. By discharging a little ballast, the machine rose with great rapidity, and the decrease of atmospheric pressure occasioned so rapid an expansion of the gas, that the balloon was fully distended, and it became necessary to part with a portion of the gas, to guard against the effect of *superior internal pressure.* Before the ascent the balloon appeared exceedingly flaccid, and it would have required at least five thousand more entire feet of gas to inflate it fully.

The temperature of the atmosphere varied considerably. At forty minutes past six, barometer 20,6; the thermometer was at 34°. At fifty-six minutes past six, barometer 19,8 (the greatest altitude attained), thermometer 32½°. At four minutes past seven, barometer 19,9; the thermometer was 31°. At eight minutes past seven, barometer 20,1; the thermometer was at 35°. At seventeen minutes past seven, barometer 21,2; the thermometer was 33°. It appears evident, therefore, that the temperature of the atmosphere was influenced by other causes than the altitude. The great increase in temperature at eight minutes past seven, Mr. Hemming attributes to the reflection of solar rays from some clouds over which they were passing.

An eudiometer tube, containing 77 measures of atmospheric air,

was inverted over water before the ascent, and on landing it was found that 27 measures had been expelled by expansion. A similar quantity confined in a syphon eudiometer was observed at the greatest altitude to occupy a space of 27 additional measures.

The descent was exceedingly rapid, in consequence of a deficiency of ballast, which is always thrown out in approaching the earth, to counteract the effects of the progressively increasing force of gravitation. A singular circumstance was noticed during the descent. A letter was thrown out when the balloon first began to descend slowly, and fell much more swiftly than the balloon; about three minutes afterwards Mr. Hemming, to his great surprise, *overtook* the letter in its descent, and passed it with so much velocity, that it appeared to be rising into the air with great rapidity.

The äeronauts suffered much inconvenience from the cold; Mr. Green, Jun. complained that his toes were frozen, and Mr. Hemming was shivering; nor is this to be wondered at, when we reflect that they quitted an atmosphere of 74°, and in little more than half an hour were surrounded by an atmosphere at 31°. Some water in the leg of a syphon eudiometer was frozen to a considerable thickness, and as it descended slowly in the tube a coat of solid ice was left in the interior. A shower of snow fell at a time when there was not a cloud to be seen above. Its appearance was very different from that of the snow at the earth's surface. The particles were minute, irregularly shaped, transparent, and very compact. During their gyrations they occasionally presented an angle at which the sun's rays were reflected with great brilliancy. They were neither light and fleecy like snow, nor spherical and opake like hail. The appearance of the shower was precisely similar to that which would have occurred if ice had been broken into very small fragments and thinly scattered in the air. No difficulty of breathing occurred, but the pulse of Mr. Hemming was greatly accelerated at the extreme altitude. It was then at 94°; at starting it was 78; and after landing 80.

Press of matter compels us to defer till our next number, the conclusion of this interesting account, which contains the result of the analysis of air collected, and calculations of the altitude.

THE THAMES TUNNEL.

This work is now entirely at a stand. A brick wall has been completed at the further extremity of the excavation, which being made water-tight, prevents any water oozing in, in that part, and also does away with the fear entertained, that if left in its unfinished state, another break-in of the river might be the consequence. The water the tunnel *makes* (if we may use the expression) at present is very trifling, and the whole of the interior is as fresh and firm as before any accident happened. The workmen, with the exception of a very few hands who are employed in thoroughly removing every appearance of the late disaster, have been discharged; and even the few now at work will in another week no longer be needed. Public curiosity appears to have slackened in a great measure, as the number

of visitors to inspect this wonderful attempt of art is now very limited, and from the slowness with which money is collected for its completion, the undertaking would appear to have completely slipped the recollection of the public. Notwithstanding the appeals made, and the time that has elapsed since the new plan was first proposed and adopted, little more than a tenth part of the sum required to finish the work has been got together. We understand that it has been proposed, in the event of the sum of £100,000. being raised, to commence working from the other side of the Thames as far as they can go, and in case of the water breaking-in as they approach the dangerous part, which is the centre of the river, building up a similar wall to that now placed at the end of the present works, and afterwards completing the centre by means of the coffer-dam. If such a plan be in contemplation, it must of necessity be attended with considerable expense; but is, perhaps, the most likely to ensure the completion of the undertaking.—*Sunday Monitor.*

SCIENTIFIC INSTITUTIONS.

London Mechanics' Institution.—Mr. Hemming concluded his course of Lectures on the *Gases*, on Wednesday, the 20th of August, when he intimated that at a future opportunity he intended to resume the subject of *Chemistry*, and introduce to the notice of the Members, the acids, salts, and other substances.

On Friday, the 22nd, Dr. Mitchell delivered a Lecture on the *Architectural Antiquities of Eastern Nations:* at the close of which it was announced by the chairman that Dr. Gordon Smith would resume his Lectures on *Arsenical Poisons*, on Friday the 29th: that an Election of Committee men would take place on Tuesday, the 2nd of September. A Quarterly General Meeting of the Members would be held on Wednesday, the 3rd of September; and that Professor Millington would commence a Course of Lectures on *Practical Mechanics* on Wednesday, the 10th of September.

Buoyant Boots.—A German paper states that a Dr. Von Mayerly has lately invented a pair of boots made of block tin, and surrounded by a hollow body, by means of which he can pass over the most rapid river. He has lately exhibited his contrivance at Pest, at which place he walked upwards of 500 fathoms in the Danube, where it is very deep, in the presence of a great number of spectators.

TO OUR READERS AND CORRESPONDENTS.

We have not room for the meteorological statement required by An Old Correspondent.

Mr. Green may obtain the information he seeks at the National Repository.

I. W. is informed that we purpose inserting a Description of Mr. Crossley's Gas-meter at the earliest opportunity.

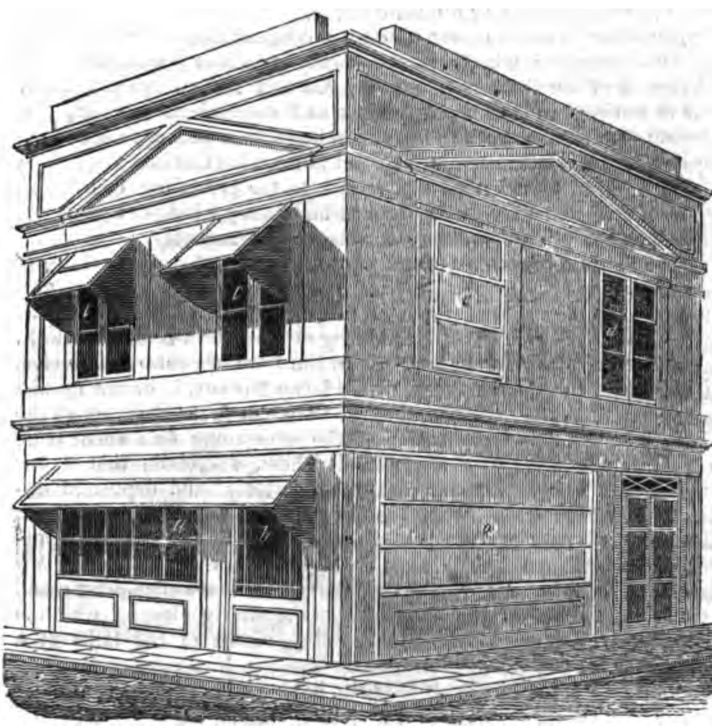
The Letters of the Nautical Instrument Maker, I. T., are received;—also those of A Farmer;—and one without signature respecting Filtering.

NATIONAL REPOSITORY.

We are much gratified to find that since our last visit to this establishment, and notwithstanding the expected early close of the exhibition for the present session, it has received an accession of a variety of useful models, machines, and curious works of art; which affords a very satisfactory proof that the skilful artisans and manufacturers of the empire, however tardy they were in the first instance in seconding the disinterested views of its public-spirited founders, are now gradually becoming sensible of the great advantages that must flow from the publicity thus given to their productions. From our own personal knowledge of many of the proprietors and inventors who have individually derived profitable remuneration from the exhibition of their articles in the gallery, we feel assured that the instances are very few in which the owners of original or meritorious productions have not been adequately compensated. Indeed, it is not easy to conceive a more effective mode of advertizing than exposing the article itself daily to the view of the numerous respectable or wealthy visitors to the Gallery, who come expressly to seek for whatever is new, curious, or valuable: and when it is considered that this advantage is obtained *without the smallest expence* to the parties exhibiting, the value of it may be duly appreciated.

In our present number we purpose describing several of the models and machines recently sent in; and by the end of the month we shall complete the account up to that period. The first we have to notice as being very conspicuous and of great merit, is the

PATENT METALLIC SHUTTERS AND SUN BLINDS.



PATENT METALLIC SHUTTERS & SUN BLINDS,

By Mr. Thomas Don, of 65, White Lion Street, Pentonville.

The object of this invention is chiefly the *better security of property*; but it has unquestionably other important advantages over the present insecure and inelegant modes of constructing shutters and sun-blinds, by various simple modifications it is also rendered applicable to every variety of windows, doors, plate, and jewellery cases, iron safes, dock and warehouse gates, &c.

The shutters are constructed of sheets of metal, strongly framed in metallic bars; they are few in number, and are arranged in horizontal rows; so that when the window or door is closed, each shutter forms a handsome pannel; and when opened, they are entirely withdrawn and deposited behind the entablature, or in the brickwork above or below the window.

From this mode of disposing of the shutters, the operation of opening or shutting may, by very simple machinery, be easily performed even by a child, in a few seconds, and within doors; thus obviating the necessity of employing a porter for that purpose, and affording *instant* security against plunder, should advantage be taken by thieves of any popular commotion or disturbance to effect it. They also thus afford a great protection against fire, should a conflagration occur in the adjoining or opposite house.

But what pleases us most in these arrangements, and renders the invention truely original, is the highly-ingenious combination or conversion of the shutters into an elegant and impervious sun blind, thus obviating, in the most perfect and convenient manner, the necessity of having both these appendages to a house or shop in a separate state. We shall now proceed to describe this invention more in detail, first, by referring the reader to the preceding engraving, which is designed to shew its application to shop windows and doors, as well as the private windows of a house; accordingly,

The figure represents a corner house, bringing therefore into view two of its sides in perspective. At *a* is shewn a shop window, and at *b* a shop door, over which is projected two of the horizontal metallic shutters as a sun-blind, having also end blinds of silk, cloth, metal, or any desirable substance, in the form of sectors of circles. In this case, the third shutter, which forms the set, is drawn up and is deposited behind the entablature. On the first floor, above the shop, *c c* exhibit the application of the same thing on a small scale to private windows: at *d* a window is shewn unclosed; that is, the shutters are supposed to be withdrawn entirely, and deposited immediately above or below it, (as the patentee adapts them to both situations.) At *e* is a window entirely closed by the shutters, presenting a barrier that the most daring burglars may exercise their arts upon in vain, and which is at the same time bullet-proof: and at *o* is shewn one of the shop windows similarly closed; which is done with the same facility as the letting down of the laths of a common Venetian shade.

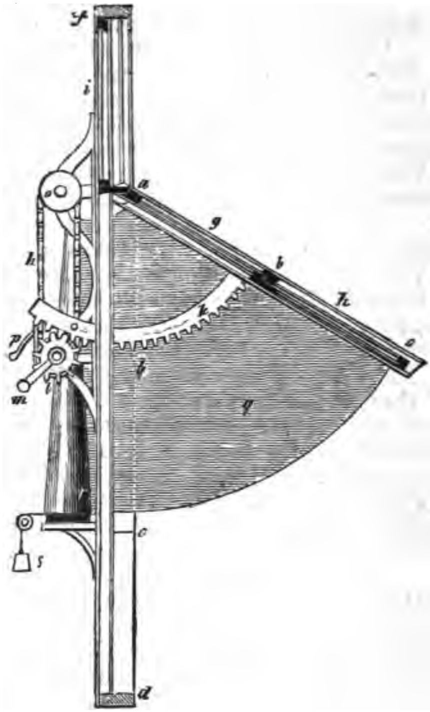
The shutters are made as follows: having determined the number

of plates or separate pannels they are to consist of, which is usually three or four, each plate (of iron or steel) is by a peculiar process of hammering, similar to that used in the manufacturing of saws, rendered perfectly flat, and somewhat hard; to harden them still more, the patentee has a process of "case-hardening" which renders the plates *impervious* even to the mechanic's drill, so as to render it impossible to enter premises guarded by such defence, without being accompanied with a very great degree of noise and violence, which thieves never resort to, as their detection would be the certain consequence. The plates so formed are next bound or enclosed in a rectangular frame of steel bars, in which deep grooves are cut by machinery; in these grooves the edges of the plates are inserted, and strongly rivetted to it. Thus framed, something like the tenon saw of the carpenter is, to its thick metallic back; they are connected together, at pleasure, by the lower horizontal bar of one, and the upper of the next being cut into acute angles that hook into one another; and they are thus drawn up or let down in succession, by sliding with their vertical sides in deep grooves cut in bars of wrought iron, which form the styles to the window. The upper portion of these grooved metallic styles is made to separate from the lower, by turning upon a pivot or hinge joint at the top of the window, by which means the shutters, while contained in the grooves, are projected out to an angle of about 60 degrees from the perpendicular, and form the sun blinds.

To effect the movements of raising and lowering the shutters, and of projecting and withdrawing that portion of them which forms the sun blind, several ingenious plans have been employed by the patentee, one of them we have seen at Messrs. Hankeys' banking-house in Fenchurch Street, and another in Princes Street, Haymarket, where the advantages of the invention have, we know, been very satisfactorily tried. Want of space will oblige us to describe only one of the methods, and for convenience merely, we adopt that which is presented in the model before us; for the clear explanation of which we have made the annexed diagram.

The figure represents a vertical section: from *a* and *b* to *c* and *d* is one of the side styles to the window; from *a* to *f* is a continuation of the style and frame behind the entablature, where all the three shutters *g h* and *i* are drawn up and deposited, when the shutters are not in use. The groove for the *upper* shutter *g* does not permit it to descend lower than *b*, nor does the groove for the *middle* shutter *h* permit that to descend further than *c*, but the groove for the *lower* shutter *i* is extended from the top *f* to the bottom *d*. The sun blind is projected only when they are all down, by which means the two upper shutters are unlocked from the lower, and the latter is afterwards drawn up to the top, as seen in the figure.

To the moveable part of the style is fixed a curved rack *k*, the teeth of which geer into those of a pinion *l*; the axis of this pinion carries a winch *m*, by turning which the sun blind is thrown out, or drawn in. To steady the motion of the blind, the movement described is made to communicate with a similar rack and pinion on the oppo-



site side of the window; for this purpose there is placed on the axis of the pinion *l* behind it, a small chain pulley, round which an endless pitched chain *n* passes, and also over a similar pulley *o*; the axis of the last-mentioned is a long shaft extending horizontally across the window (above the glass) to the opposite side, where a corresponding apparatus projects, and supports that side of the sun blind. In order to fix the blind at any required angle that it may be desired to project it, there is on the axis of *l* a ratchet wheel, with a pall above *p* which falls into the teeth on its periphery, and prevents its return without being lifted up.

The side or end blinds, one of which is represented at *q*, are made of cloth, or any flexible substance; one side is attached to the projecting part of the style, and the other passing through a long and very narrow slit is attached to a conical roller *r*; when the shutters composing the blind are drawn in, the conical roller is turned by means of a descending weight *s*, which then winds upon it in even layers the blind of the figure of a sector of a circle.

To the middle of the lower edge, and at the back of the bottom shutter *i*, a suitable line or chain is attached; this line is carried up vertically, then passes over a pulley at the top of the frame, and from

thence over side pulleys down to a barrel on one side, on which the cord is wound. The lower edge of the shutter *i* has likewise a projecting ledge; on the drawing up of the lower shutter, therefore, by the cord and winch described, the bottom edges of the middle and upper shutters come in contact with, and rest upon the ledge, and are thereby carried up altogether into the casing behind the entablature; to keep the shutters in the situation they are thus put, a pall drops into the teeth of another ratchet wheel placed on the axis of the winding barrel.

We have been induced to confine ourselves to this single mode of effecting the required movements, on account of the patentee having made some very important improvements in the apparatus for the purpose, and in simplifying and strengthening the whole. We have been made confidentially acquainted with the precise nature of these improvements, which we shall be at liberty to explain by-and-bye: but we have no hesitation in stating, that if the invention was previously, as stated by an eminent lecturer in mechanics, "*one of the most useful and complete*," that it is now *one of the most perfect*. In prosecuting this undertaking so as to be able to manufacture these patent metallic shutters and sun blinds at a reasonable charge to the public, the patentee has been unsparing of labour and money; and in the devising and constructing of various machinery for the purpose, he has made some important improvements, tending greatly to facilitate and improve the quality of the work executed: which we shall probably have one day the pleasure of describing.

Notwithstanding the length to which this article is extended in our pages, we observe that we have left several points unnoticed which ought not to be omitted.

It will be perceived that the expense of battening out walls and fixing up boxings to contain the shutters on the ordinary plan, will be entirely saved by the introduction of Mr. Don's plan; and less space being required a greater quantity of light will be admitted in the same sized window. The invention may be employed with great advantage in market-houses, public warehouses, and docks, as a long range of apartments, or an extensive warehouse or hall, may be instantly closed or thrown open.

As a preventive to fire, the usefulness of this invention is not confined to the before-mentioned circumstances, of a conflagration in the adjoining or opposite house, but if applied to the principal passages, such as the openings into halls, staircases, &c. in large buildings, the progress of fire in different parts of the building might be arrested, by cutting off the supply of air. In like manner, if applied to fire places, it may be used to extinguish either the fire in the stove, or an accidental one in the chimney.

We understand that the patentee has received orders from several banking-houses, and that the applications from jewellers and other classes of tradesmen are exceedingly numerous: and so convinced are we of the great public utility of these metallic shutters and sun blinds, that we should strongly recommend the patentee to extend considerably his premises, and appropriate a greater portion of capital in their manufacture.

PATENT PROCESS IN RECTIFICATION,

By John M'Curdy.—*Enrolled October*, 1827.

This patent process consists in the employment of fresh-burned charcoal in the rectification of spirits, for the removal of empyreumatic flavour, with which British spirits are usually contaminated. The patentee directs that the charcoal be reduced to a powder, and that about one part of charcoal (by measure) be put into the still with four parts of the spirit previous to rectification. The patentee proposes the same process for getting rid of the essential oils, so as to obtain the spirit perfectly pure, and by that means render it peculiarly suited for the preparation of liqueurs and cordials, in which it is desired to give the flavour only of such matters as are added to the spirit.

Charcoal has been employed for about a century past, for the very purpose designed by this patent. Under the article Alcohol, in Dr. Ure's Chemical Dictionary, he says, "The *arriére gout* of bad spirit can scarcely be destroyed by infusion with charcoal and re-distillation." This application of charcoal, we imagined, was well known to every person having the slightest knowledge of chemistry or of distillation only.

PATENT SELF-ACTING WATER SPRING,

By White & Aveline, opposite to N°. 48, Oxford Street.

Model in the National Repository.

By this invention the water is made to filtrate upwards, by the pressure of a column of water, proceeding from a reservoir above, which renders the operation continuous, and requires no manual labour to supply it; it therefore bears a close analogy to a natural spring in the earth, and consequently the name given to it by the patentees is by no means an unsuitable one. The quantity of water that may thus be made to pass through a filtering substance, will be proportionate to the area of the stone multiplied into the height of the column of water in the pipe; but taking the pipe at a medium length for the altitude of the houses in London, (to the top of all of which, the water companies can discharge their water), which is about 35 feet; and taking the area of the stone at 113 square inches, the latter will then sustain a pressure from the column in the water-pipe, of about 1800 pounds, and the product of filtration is in this case found to be half a gallon per minute, or thirty gallons an hour; which is an immense quantity to pass through a stone of only 10 or 11 inches square; and much more than can be required under ordinary circumstances in a private house. We have been informed that the patentees have fixed a great many of them, and from the simplicity and superior excellence of the plan, we shall be happy to learn of their extensive adoption.

The machine is constructed chiefly of cast-iron, painted to resemble marble; the external form is elegant, and the whole apparatus is of great strength, and will, no doubt, prove of great durability.

The annexed figure exhibits a vertical section. *a* is the cistern which receives the water, in its impure state; it has a ball float and lever, to keep a constant head of water over the pipe *b*, and likewise to prevent any air passing down it. The pipe *b b* is shewn separated, that the space between may be considered as of any required length. To the lower end of the pipe there is a nozle *c*, through which the pipe passes, which causes the water to shoot up against the under surface of the filtering stone *f*, which it is said expedites the process; the water oozes through the stone with great rapidity to regain its level, leaving the animalculæ and other impurities in the lower part or basin *e* of the machine, from whence they are drawn off occasionally by the under cock *g*, and carried away by the waste pipe *h*.

When the filtered water rises in the reservoir above *k*, to a certain height, the filtration is stopped by the rising of the float *l*, which by its lever or rod *n* shuts a cock *o* in the supply pipe. When the stone has become charged with a deposit on its under surface, it is capable of being cleansed by the scraper *s*, which is turned round by means of a handle shown at the bottom of the reservoir *k*, the axis passing through the stone; provision is thus made for reviving the filtering properties of the stone, whenever required, and with very little trouble. The invention is upon the whole a very perfect and highly useful machine.

PATENT APPARATUS FOR SHARPENING KNIVES.

By Francis Westly, of Leicester.—*Enrolled July*, 1828.

Some time back we described a small instrument for sharpening knives, little thinking that the subject was of sufficient importance to form the ground of a second patent; but it appears that we were mistaken, and that the instrument in question had sharpened the wits of the present patentee, who has produced another ingenious contrivance for superseding the old-fashioned single bar of steel. The annexed drawings and description will explain Mr. Westly's invention.

Fig. 2. *Fig.* 1.

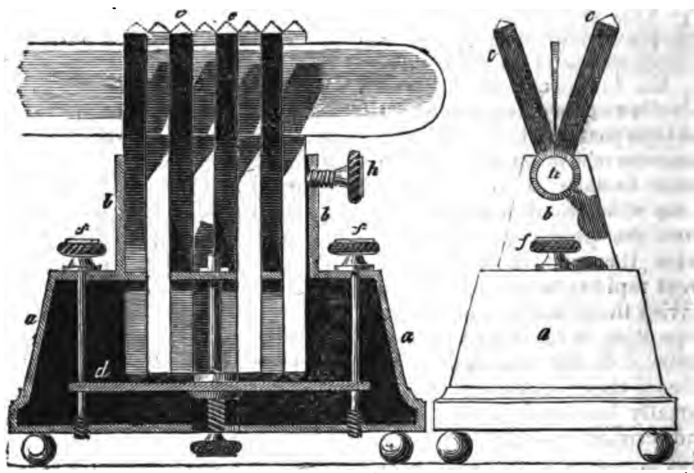


Fig. 1 is an end elevation of the instrument, and fig. 2 a side elevation of the bars, with a section of the boxes *a* and *b* to shew the interior. The same letters in each figure have reference to similar parts. *a* is a small oblong box, having a smaller box *b*; in the top of the latter there is a slit made throughout its length, and of sufficient width to receive the square bars *c c*. The box *a* has two similar slits. The surfaces of the bars *a a* are draw-filed, they pass through the slit in *b*, and alternately through both slits in *a*, so as to cross each other, as shewn in fig. 1. The lower ends of these bars are supported upon a plate of metal *d*, which can be elevated so as to bring a different portion of the bars into operation, by means of the screw. *f f* are two screws passing through the holes in *d*, to preserve its parallel motion, and likewise to support the bottom of the box; *h* is a tightening screw to steady the bars *c c*.

The operation is merely to place the edge of the knife upon the bars, so as to bisect the angle formed by them, and then draw the knife backward and forward. As the surfaces of the bars wear away, different sides can be presented, or they can be shifted from end to end, so as to present fresh surfaces to the knife.

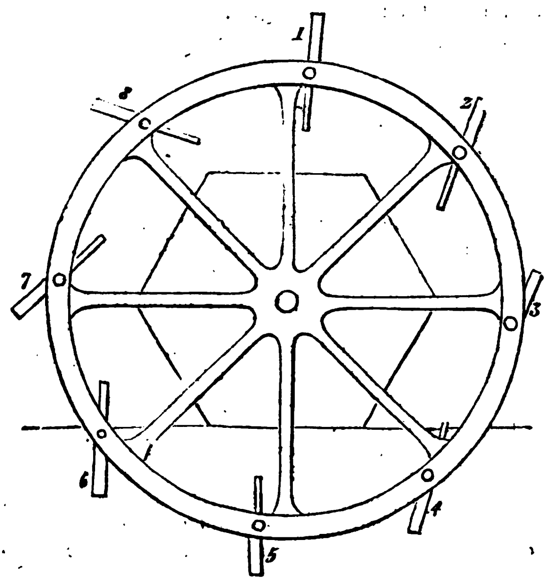
SKENE'S PATENT PADDLE WHEELS.

The last number (264) of the Mechanics' Magazine contained a description of this invention, and to it was appended the following note by the editor.

"Lieut. Skene complains, in a note which we have received from him, of a very erroneous account which has been given of his patent, in the 'Register of Arts' for July last. 'As it is calculated,' he says, 'to do me a serious injury, I request to be allowed, through 'your work, to contradict the same; it being as like my invention, 'as if I were to ascend the dickey of a coach to drive it to London 'with my back to the horses.' The description of it which we now publish, having been seen and approved of by Mr. Skene, will, we trust, have the effect of removing any injurious misapprehension which the errors (unintentional, of course) of our contemporary may have occasioned.—*Edit. Mech. Mag.*"

Not one person in a hundred who might read the above note but would conclude that we *had* prejudiced the invention of Mr. Skene by an incorrect description of it; what, therefore, would be their surprize to find that the *very contrary was the fact*; to find, that *we* had represented the apparatus in the most favourable light in which it could be viewed, while *Mr. Skene,* (by his amanuensis and draftsman) had himself exhibited the invention in the Mechanics' Magazine so incorrectly, as to render it perfectly absurd.

We cannot afford space to copy the words of the description; suffice it to say, that it is a very proper accompaniment to the drawing, of which we annex a fac-simile in outline.



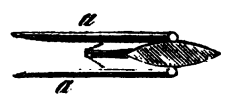
The figures 1 to 8 we had put to the paddles, to shew the direction in which they are supposed to revolve, (which is, however, not stated in the Mechanics' Magazine,) and with the view of making a remark upon each consecutively; but we now think it would be a waste of time to do so; as the drawing itself will sufficiently determine whether Mr. Skene has not himself "*injuriously mis-represented*" the invention, and not us. At any rate Mr. Skene will now have full justice done him, by the insertion of that which he has "*seen and approved.*"

NEW PATENT MODE OF PROPELLING VESSELS.

By John Nairne, of London.

We are sorry to find a patent for so important an object without any drawings to illustrate the invention; for the two little figures imbedded in the text of the specification, which are not larger than the writing, might almost as well have been omitted, for the slight information they convey. The scheme is in its leading features old, and has hitherto failed; nor do we think that the patentee's modification of it, as far as we can comprehend it, to be any improvement on most of the preceding attempts of the kind.

Two, four, or more levers are to be suspended over the sides of a vessel, and to descend nearly as low as the vessel's keel. These levers are to be moved backwards and forwards like a pendulum, the motion being communicated by a steam engine, or other prime mover, and that the levers may experience but little resistance from the water, they should be of such a shape as to present in their horizontal section a form like the adjoining fig. 1.



At each side of the lever at its lower extremity is attached a broad plate of iron *a a*, fig. 2, by means of hinge joints, which, upon the lever being moved forward, close, and offer no resistance; but when it is moved backward they open or expand, and thereby impel the vessel forward. To prevent their opening beyond the proper angle, which is from 140 to 160 degrees, a circular arc may pass through them, or they may be connected to chains, which only allow them a certain range of opening, or any other method to admit their expansion may be employed.

The patentee further describes a method of turning these oars or levers round, when it is required to back the vessel; likewise, what he considers to be the best method of connecting the levers to the engine; but without drawings we doubt whether we could give the reader a clear idea of his plans in a moderate compass.

ON VARIOUS PLANS FOR PROPELLING STEAM VESSELS.

TO THE EDITOR.

SIR,—The late numbers of the Register containing accounts of several modifications in the wheels employed for propelling steam vessels, as well as some substitutes for wheels, I beg to submit to the consideration of your readers a few remarks upon some of these inventions, as also upon Mr. Galloway's letter upon the same subject in your last number.

To begin with Mr. Skeene's wheel; the inventor's object seems to be to get rid of the back water; to effect which the paddles are suspended by a horizontal axis, passing through their centre, and a weight is added to the lower portion of the paddle, to cause it to quit the water in a vertical position; but although the back water is done away with, there is a great loss of effect in this arrangement, since the paddles cease to act upon coming beneath the centre of the wheel, and till they arrive at that position, their action, on the most favourable supposition, can only be the same as that of paddles arranged upon the common plan: whilst the probability is, that the paddles entering the water would assume a nearly horizontal position, from the water pressing only on the lower part; for the weight upon this part could never resist the pressure of the water upon it, if the wheel were revolving with rapidity. I am also of opinion, that if the stops or shoulders upon the upper part of the paddles, by which they are in certain parts of the revolution enabled to take the same position as the paddles in a common paddle wheel were removed, (and if the two parts of the paddles balance each other, as Mr. Skeene supposes, they are needless), the effect of the wheel would be nothing. These paddles also appear peculiarly ill adapted to backing astern.

Mr. Steevens's plan is much superior; but still I cannot concur in the encomiums passed upon it both by Capt. Ross and Mr. Galloway, neither of whom have adverted to the circumstance, that with a paddle wheel of the same breadth, little more than one-third the resistance would be obtained from the water, on account of the paddles being only one-third the breadth of paddles attached in the ordinary way; for very little additional resistance would be obtained from placing several paddles behind each other upon the same crank; this Mr. G. himself admits, since in the improved arrangement described in his letter, the number of paddles on each crank is reduced from four to two.

I do not clearly understand the advantage attributed by Mr. Galloway to these wheels, namely, that the paddles during the whole time of their immersion, travel faster than the vessel; if he means that their extremities describe an arc, whilst the vessel moves through the chord of that arc, that is an *objection* which he makes to the common paddle wheels, and it is clear they cannot pass through a greater horizontal space than the vessel: neither would it be an

advantage if they could. The diagram shewing the difference between the path of these paddles and of the common ones, is not quite conclusive in their favour, since in it the common paddles are supposed to descend to a greater depth, and, of course, they obtain a better fulcrum to act against; had the cranks upon which the paddles are set been supposed to be of the same diameter as the wheel of the ordinary construction, with which it is compared, and the paddles in each instance to be of the same depth, then, as the paddles in Mr. Steevens's arrangement would enter the water more perpendicularly than the common ones, they must, of course, enter the water sooner, and quit it later than the latter; besides which, the curve described by them would exceed the circular arc described by the common paddles having the same chord and versed sine. In respect to the space occupied by each, as the guide rods and radius rods would require to be enclosed, the paddle boxes would be nearly the same height as for the common paddle wheels, whilst for the patent paddles to press against an equal surface of water would require their paddle boxes to be three times the width. I should observe the curve described by these paddles is no portion of an ellipse.

With regard to Mr. Steenstrup's wheels, I think the inventor has drawn a wrong conclusion as to the most advantageous depth for immersing his wheels. That is the most advantageous depth for them, at which, with the same force expended, they would propel a vessel through a given space in the least time, and not in the smallest number of revolutions of the wheel; in the experiments detailed by Mr. Steenstrup, this appears to have been when the wheel was immersed about one-third of its diameter, when totally immersed the power applied was evidently inadequate to the resistance, since it required 6 minutes to make 128 revolutions, whilst with the wheel immersed one-third of its diameter, 154 revolutions were made in 5¼ minutes. But this mistake on the part of the patentee does not affect the real merits of the wheels, and I cannot agree in Mr. Galloway's condemnation of them: the position of the paddles when immersed only their own depth in the water, would be nearly the same as in Mr. Steevens's arrangement, and they would act upon a much larger surface: if the experiments are correctly stated, the wheels will impel the vessel when totally immersed, which no wheels before proposed can do; and although Mr. Galloway deems this part of the plan as too absurd for notice, I think that property might possibly be turned to advantage in steam vessels intended for warfare; at all events, it shews that these wheels will not be effected by the plunging of vessels in bad weather. With respect to the originality of the invention, I can say nothing; although admitting that neither the mode of turning the paddles on their axis, nor the causing them to describe half a revolution to each revolution of the wheel be separately original, yet the combination of the two plans may justly become the subject of a patent.

Mr. Hale's plan for substituting a force pump for the present paddles is by no means new, and although the plan has several recommendations, as occupying little space, being protected from the

action of the waves, as also from shot, and not impeding a vessel's sailing, still it is to be feared that sufficient resistance could not be obtained from any size of pumps it would be practicable to use.

Having thus noticed these several inventions, I shall briefly point out certain objects to be kept in view in attempts at improving paddle wheels. To produce the greatest possible effect, the paddles should stand perpendicularly during the time they are immersed; when they are in an oblique position, a portion of power is expended in raising or depressing the water, and their power to advance the vessel will be as the sine of the angle at which they stand; their motion through an horizontal space should be uniform, and the greater their surface, the greater will be the resistance they receive from the water. This surface, unless in vessels intended for shoal water, is best obtained by giving depth rather than breadth to the paddles, on account of the pressure of the water increasing with the depth, thus rendering less surface, that is, smaller paddles, necessary.

Upon an attention to these points, in my opinion, the effectual action of the paddles depend, although there are, doubtless, other subjects to be considered besides the mere speed of the vessel; and these may prevent the whole of the preceding conditions from being rigorously fulfilled.

Hoping that from the great attention this interesting subject is receiving from various quarters, that material improvements will yet be effected, I remain, Sir, your obedient servant,

J. M.

September 8, 1828.

AEROSTATIC EXPERIMENTS,

By Mr. Hemming.

[Continued from page 287.]

The increase in the pulsation corresponds with some experiments made on Mount Etna by Dr. Brunner, in 1826, whose pulse increased from 62 to 84 at an altitude of 10,000 feet.

The temperature of the boiling alcohol varied with the altitude, its range was from 160° to 153° 5; at that temperature the barometer was at 19, 8; this was at the greatest height. The alcohol boiled at 176° on the surface of the earth, at the pressure and temperature of the atmosphere stated in our last when Mr. Hemming ascended. The variation was therefore 22°, 5, which, according to the calculations of Le Roi, gives an altitude somewhat exceeding two miles.

The height, as indicated by the barometer and thermometer, has been calculated by the aid of Professor Lithrow's tables, published in the first volume of the Memoirs of the Astronomical Society of London, and is found to be 11225, 6 feet. This, it will be seen, corresponds with the altitude given by the temperature of the boiling alcohol. An instrument has been since constructed by Mr. Hemming, which will always register the extreme altitude attained according to barometric observation with the greatest precision, and

with little trouble, which we shall describe in a future number. No alteration was discovered in the tone of voice at the greatest height; nor did there appear any reverberation of sound made by shouting, in passing through clouds, or when over them. A few minutes previous to the descent, the äeronauts passed through a dense mass of clouds, and were involved for a few seconds in the darkness of midnight. The time could not be ascertained by the watch in consequence, nor the height of mercury in the barometer or thermometer. On emerging from these clouds, a beautiful prospect of sea and land was presented, which does not appear to have given the äerial travellers much delight, as they were rapidly approaching the former, which appeared to be within three or four miles. On approaching the earth, a contrary current of air impelled the balloon in a direction almost opposite, and they landed near Maidstone, in Kent, at twenty minutes before eight, having been one hour and forty minutes in the air, and performed a distance of forty miles, independent of the space travelled in different directions by the various currents of the atmosphere. Two bottles of air were collected, and subsequently analysed by Mr. Hemming. That taken from the greatest altitude contained precisely 21 per cent. of oxygen, as indicated by explosion with hydrogen, by mixture with nitrous gas, by an eudiometric liquid; and by platinum balls. That which was taken from a lower station (barometer 21,2), analysed by the same processes, was found to contain about 21,4 of oxygen. Carbonic acid was present in each portion. The quantity left unanalysed is yet to undergo delicate experiment for the purpose of discovering the proportion of vapour it contains.

MISCELLANEOUS INTELLIGENCE.

Steam Boat for Canals.—The proprietors or shareholders of the various canals have hitherto manifested a disinclination to allow the use of steam boats, under the apprehension (though a groundless one) of injuring the banks of the canals. But we are happy to find the prejudice is likely to be removed; for a steam boat of about twenty tons, fitted on the principle of steam generating pipes in lieu of boilers, was lately dispatched from the Paddington canal to Leeds. The vessel had a paddle-wheel in the stern, in lieu of one on each side, by which means the ripple of the water is inconsiderable in comparison with what it is with the ordinary steam boats on the Thames. It was not considered advisable to work the boat beyond a speed of five or six miles an hour, though the engine would have admitted of nearly double that speed. The consumption of fuel was stated to have amounted to one ton for the whole distance, consequently the saving of expense in horse-labour must be immense when steam becomes to be generally substituted for horses in working canal boats.—*Newspapers.*

Culture of the Amaryllis.—This elegant genus of plants suffers much from the attacks of the mealy bug; for the destruction of which

the following recipe is asserted to be effectual.—Dissolve one drachm of mercurial ointment in one ounce of neat's-foot oil; with this mixture anoint the infected plants with a small painter's brush, allowing some of it to pass to the bottom of the leaves and in among the scales of the bulb; this, when thoroughly done, will kill or banish the insects for ever, without at all hurting the plant.—*Gardener's Magazine.*

Annual consumption of London.—The number of oxen annually consumed in London has been estimated at 110,000, calves 50,000, sheep 770,000, lambs 250,000, hogs and pigs 200,000, besides animals of other kinds.

The total amount of butchers' meat sold at the principal market, which is Smithfield, is estimated at 8,000,000 lbs. annually. There are on an average annually brought to Billingsgate market 25,000 cargoes of fish, of 40 tons each, and about 20,000 tons by land-carriage; in the whole 120,000 tons. The supply of poultry being inadequate to the demand, the prices are consequently high, and that article is mostly confined to the tables of the wealthy. The consumption of wheat in London may be averaged at 900,000 quarters, each containing eight Winchester bushels; of porter and ale 2,000,000 barrels, each containing 36 gallons; spirits and compounds 11,000,000 gallons; wine 65,000 pipes; butter 21,000,000 lbs., and cheese 26,000,000 lbs. The quantity of coals consumed is about 1,200,000 chaldrons of 36 bushels, or a ton and a half to each chaldron. About 9,600 cows are kept in the vicinity of London, for supplying the inhabitants with milk, and they are supposed to yield nearly 7,900,000 gallons every year; even this great quantity, however, is considerably increased by the dealers, who adulterate it by at least one fourth with water, before they serve their customers. The difference of feeding cattle about the year 1700, and at the present time 1828, is strikingly illustrated by the following comparison. In the year 1700 the average of the oxen sold in the London market, was 370 lbs.; of calves, 50 lbs.; of sheep, 23 lbs.; and of lambs, 18 lbs.: the present average weight is of oxen, 800 lbs.; of calves 140 lbs.; of sheep, 80 lbs.; and of lambs, 50 lbs.

Subterraneous Communication between distant Volcanoes. "There is no question but that the ground under the Solfaterra is hollow; and no reason to doubt that there is a subterraneous communication between this crater and that of Vesuvius. Whenever Vesuvius is in an active state, the Solfaterra is comparatively tranquil. The subterraneous thunder heard at such great distances under Vesuvius, is almost a demonstration of the existence of great cavities below filled with äeriform matter; and the same excavations, which in the active state of the volcano threw out, during so great a length of time, immense volumes of steam must, there is every reason to believe, in its quiet state, become filled with atmospheric air. On the hypothesis of a chemical cause for volcanic fires, and reasoning from known facts, there appears to me no other adequate source, than the oxidation of the metals which form the basis of the earths and alkalies. But it must not be denied that considerations derived

from thermometrical experiments on the temperature of mines and sources of hot springs, render it probable that the interior of the globe being composed of fluid matter, offers a still more simple solution of the phenomena of volcanic fires."—*Philo. Transactions.*

"The Horses of Buenos Ayres are generally from fourteen to sixteen hands high, plenty of bone, and swift. Although their food is pasturage alone, they are often ridden a distance almost incredible. Thirty-five leagues in fourteen or fifteen hours is not an uncommon thing for one horse to perform. The equality of the stoneless plain, and the easy gait of the unshod horse, do not a little concur to render the performance of long journies easy. The horses of the plains are exposed to the stings of musquitoes, to scorching suns, to heavy rains, and to hoar-frosts in winter, when the south-wind blows bitingly cold, all which render them extremely hardy; whilst the liberty they enjoy in wandering up and down the plains, plunging in running streams or large pools of water at pleasure, added to the invigorating effects of pure air, render them less subject to disease than the horses of Europe, confined in hot and unwholesome stables, and where the hardness of the roads subjects the hoof to the tortures of the smith."—Page 155, *Unpublished Memoirs of General Miller.—London Weekly Review.*

LIST OF NEW PATENTS.

RAISING WATER.—To Antoine Bernhard, of Finsbury Square, for an apparatus for raising water and other fluids. Sealed 24th July. Six months for enrolment.

PIANO-FORTES.—To Robert Wornum, of Wigmore Street, for improvements in upright piano-fortes. 24th July. Two months.

CLOTH.—To J. C. Daniell, of Bradford, Wilts, for improvements in preparing woollen cloth. 5th August. Six months.

WHEEL CARRIAGES.—To John Lane Higgins, of Oxford Street, for improvements on wheel carriages. 11th August. Six months.

BRICKS.—To Wm. Mencke, of Peckham, Surry, for improvements in the making of bricks. 11th August. Six months.

PUMPS.—To L. R. Fitzmaurice, of Jamaica Place, Commercial Road, Middlesex, for improvements in pumps, and the application of the same to turning lathes, &c. 11th August. Six months.

EPSOM SALTS.—To Wm. Grisenthwaite, of Nottingham, for a new process for making sulphate of magnesia. 11th August. Six months.

SPURS.—To Henry Maxwell, of 99, Pall Mall, for an improvement in spring spur sockets. 13th August. Two months.

FILTERING.—To Thomas Stirling, of the Commercial Road, Lambeth, for improvements in filtering apparatus. 16th August. Six months.

WEIGHING MACHINES.—To B. M. Payne, of the Strand, for improvements on weighing machines. 18th August. Six months.

WEAVING.—To Edward Barnard, of Nailsworth, Gloucester, for improvements in weaving and preparing cloth. 19th August. Six months.

CLOTHS.—To P. Foxwell, W. Clark, and B. Clark, of Minchinhampton, Gloucester, for improvements in shearing and finishing woollen cloths. 19th August. Six months.

SPINNING.—To Wm. Sharp, of Manchester, for improvements in spinning, &c. fibrous substances generally. 19th August. Six months.

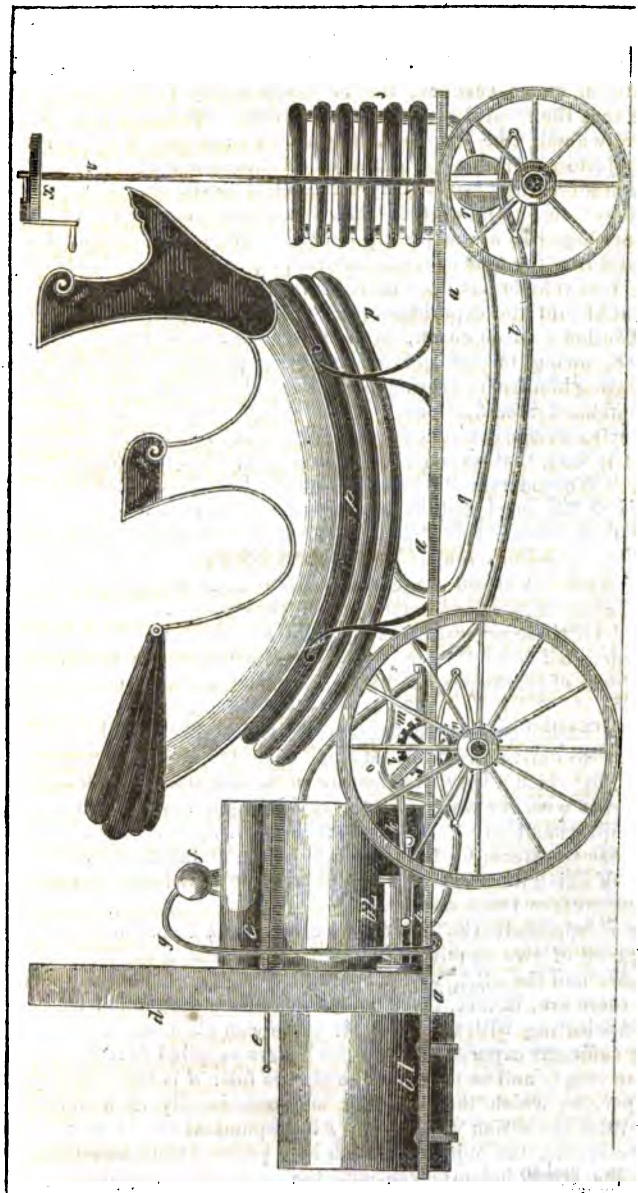
TO OUR READERS AND CORRESPONDENTS.

The following subjects are amongst those which are intended for our next.

Dr. Harland's New Patent Steam Phaeton.—Wilkinson's New Patent Mangle.—Cleland's New Patent for Refining Sugar, &c.—Mr. Gutteridge's paper on Trussing Girders.—Mr. Lockhart's Sash Windows.

Mr. Steenstrup's Patent Steam Engine, and Patent Steam Generating Apparatus.

The communications of L. H. and W. C. B. are necessarily postponed for a while. A Constant Reader has our best thanks.



DR. HARLAND'S PATENT STEAM PHAETON.

PATENT STEAM PHAETON,

By Dr. Harland, of Scarborough.—*Enrolled June*, 1828.

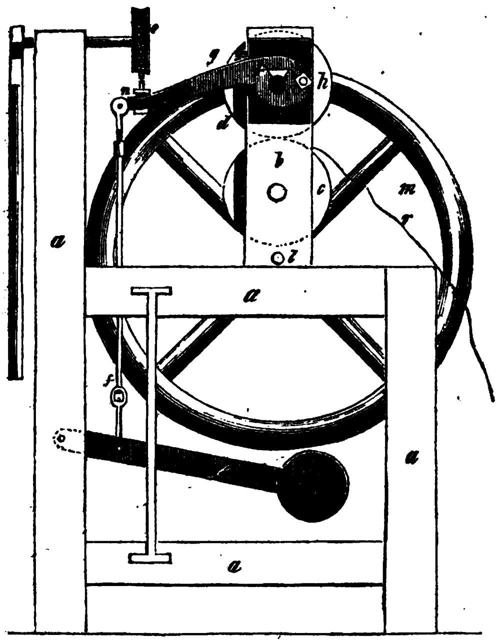
Introductory Remarks. Although the public has heard but little recently of steam coaches, and although a very general impression exists that the several attempts to construct them have terminated in failure, we will take it upon ourselves to say, that the greater part of the projectors mentioned in our former notices are still in full activity, and that several new aspirants for mechanical honours are also labouring to achieve that great object. Mr. James has, we are informed, an elegant stage coach, completely built, but is now undergoing various alterations in the minor arrangements, preparatory to making a public trial; this vehicle has been built for Ireland, to which country it will be sent should the experiments prove satisfactory. With respect to Mr. Gordon's steam coach, proceedings have been temporarily suspended, owing to that gentleman's other professional engagements preventing him from devoting his present attention to that subject; but the intended modifications will be shortly proceeded with. Mr. Gurney's carriage continues to make frequent experimental excursions; and it is said, that he is gradually improving the arrangements of the parts. We understand that Mr. Gurney has found that one of the effects of his machinery is to twist out the spokes of the running wheels; to obviate this difficulty, he is now applying Jones & Co.'s patent suspension wrought-iron wheels, described in our 29th N°., new series. A steam waggon has been built by Mr. Hague, with which experiments have been made on the eastern roads of the metropolis. Of these several plans we shall shortly have occasion to give some detailed accounts, we therefore proceed to the description of the object of this paper, Dr. Harland's Steam Phaeton.

The improvements contemplated by the patentee, by which he expects to derive great advantages, are—1st, the construction of a boiler, by which a very large surface of the fire and flue will be placed in contact with the water, for the rapid production of steam; 2ndly, the employment of a condenser which by its extensive surface shall condense the steam by the influence of the atmosphere; 3rdly, in a mode of fixing the working cylinder without allowing it to vibrate on hollow arms or trunnions.

a a represents the bed of the carriage; *b* 1 and *b* 2 the boiler, composed of two double cylinders, *b* 1 containing the fire grate and ash pit, and the cylinder *b* 2 containing another double cylinder, so that there are, in fact, three double cylinders, each full of water, and communicating with the reservoir and steam chamber *c*, which must be of sufficient capacity to keep the boilers supplied during the period of one stage, and so that they be always full: *d* is the chimney; *e* a damper, by which the boiler *b* 2 may occasionally be withdrawn in part from the action of the fire: *f* is a spherical vessel on the top of the reservoir, the object of which is to prevent the water thrown up with the steam being driven with the steam into the pipe *g*, which conveys it to the working cylinder *h*; this cylinder is secured horizontally to the bed of the carriage, and having guides extending from

end to end, in which side rods attached to the cross on the piston rod move, and carry with them the connecting rod *k*, which turns the crank *l*; this crank has on its axis a toothed wheel *m*, and revolves in bearings placed on the bed of the carriage. The carriage receives its impulse from the engine upon the hind wheels; the axis of these carry small tooth wheels *n*, which gearing into *m*, receive their motion and thereby turn round the running wheels. Arrangements are made by the patentee for throwing the toothed wheels *m* and *n* out of gear, and bringing into operation another pair of wheels on the same axles, when additional power is wanted; but the apparatus for this purpose is not brought into view in the engraving, to prevent confusion. At *o* is an eduction pipe leading to a series of tubes *p*, which are denominated the condensing chambers, and may be used either alone or in conjunction with water to condense the steam on leaving the cylinder: *q* is a pipe for conducting the water and uncondensed steam into a globular vessel *r*, connected with an additional series of condensing pipes *s*, of an annular form, and connected with each other by short pipes: *t* is a pipe for returning the condensed water from *r* to the boiler, by the aid of a small force pump: *v* is a forked rod attached to the steering wheel *x*, and descending into holes in the arms of the fore wheels, and having liberty to move up and down, according with the inequalities of the road; the vertical standard upon which the horizontal steering wheel *x* is fixed, also forms the centre of motion to the arms of the fore wheels, and is thereby made to direct them in their course.

The advantages contemplated by the patentee in these arrangements will, we fear, not be realized. In the construction of the boiler we can discover nothing to congratulate him upon. The attempt to condense the steam has been long since abandoned by those who have had most experience on the subject: it is evidently impracticable to carry sufficient water to effect even a tolerable condensation; the conducting power of the air is much too slow for the abstraction of the heat, and it should be considered that the air which is liberated from the boiling water, would require a pump to draw it off, which would add to the complexity of the machinery. With regard to the mode of fixing the cylinder, there is no novelty, as will be perceived upon reference to our description of Mr. Gurney's carriage. The mode of communicating the motion to the wheels appears to us to be highly defective, perhaps the worst that could be devised; for it will be observed, that the *driving* toothed wheels *m* are (in effect) mounted upon the springs of the carriage, above the *driven* toothed wheels *n*, by which means they will be continually liable to be thrown out of gear by the motion of the carriage upon the springs, and the teeth will be liable to break from the same cause. This is the only novelty of any moment in the invention, and one which would certainly have remained secure, without the protection of letters patent. From the talent and ingenuity of the learned doctor we shall hope for better things, should he persevere in his laudable attempt to transport us on the public highways by steam.



PATENT IMPROVEMENTS ON MANGLES,

To be called "Bullman's Cabinet Mangles,"

By SAMUEL WILKINSON, of Holbeck, York.—*Enrolled June,* 1828.

FOR a long period the mangle was a rude unwieldy machine, requiring great exertion to work it; and from the peculiarity of its motion, which was 1½ or 2 turns in one direction, and as many in the reverse direction, caused great fatigue to the persons working it. A great improvement was introduced in Baker's patent mangle, by an ingenious method of procuring the reciprocating motion of the loaded box, from the continuous revolution of a winch; and this, together with the superior workmanship, greatly reduced the labour of working the machine. Still the space occupied by the machine was not reduced, and the mangle remained without any further material improvement for a long time. The principal object of the different inventors who have turned their thoughts to the subject, being merely to simplify the method of obtaining a reciprocating action from a rotatory one. For some of these see the former numbers of the Register.

In 1823 a patent was taken out by Mr. Snowden for an erect or vertical mangle, in which the objections to the former mangles, viz. the space required, was obviated; as this would occupy only about one-third of the room of the horizontal mangles. We believe two or

three other patents for mangles upon this principle have since been taken out, besides the present one, but for reasons we are not acquainted with, none of them have come into general use.

The following is the description of the subject of this article,—*a a* represents one side of the frame; *b* one of the cheeks supporting the lower roller *c*; the upper roller *d* rests upon the lower one; the pressure is given by the weighted lever *e*, suspended by the rod *f* from the lever *g* which turns upon a fulcrum *h*, and has a piece of hardened steel *k* dovetailed into it, in which the axis of *d* works: the lower roller *c* has a wheel on its axis, turned by a pinion on the axis *l* of the fly wheel *m*, and the fly wheel is made to revolve by a handle on one of its arms. To raise the upper roller to place under it the articles to be mangled, the arm *g* is connected to a similar arm on the opposite side by a cross bar *n*, suspended by a chain from the wheel *o*, which being turned by the lever *h* elevates the arm *g*, and with it the upper roller *d*; the waved line *r* merely represents the situation of the mangling cloth.

Upon the merits of the present machine we can offer no opinion, the patentee having given no explanation as to the mode of working it, whether by continuous or reciprocating action. Some articles will require to be passed under the rollers more than once, and we can discover no method in the present machine of doing this, but by reversing the motion, which will require attention on the part of the mangler, who must watch until the goods are nearly past the rollers, and then reverse the motion; whilst the common mangle performs this of itself. If the mangling cloth were an endless web passing over other rollers, a rotatory motion alone would be required; but the patentee does not state that he uses any such arrangement. The machine seems calculated to obtain a considerable degree of pressure in a convenient manner.

ON TRUSSING GIRDERS.

Communicated by Mr. Wm. Gutteridge.

TO THE EDITOR.

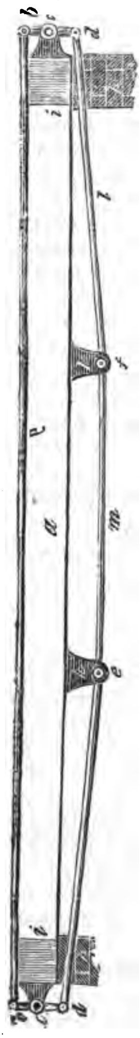
Sir,—This is a subject involving the preservation of human life, and therefore requiring no apology from those who come forward in its aid; and the many lamentable proofs which have been adduced, by the falling in of edifices, and burying alive the victims of ignorant pretenders to knowledge, who superintend and lay down places and rules for erecting those edifices, renders it necessary that ideas more correct and definite on communicating strength should be promulgated.

One of the most important considerations which presents itself to our notice, is that of giving strength to beams, or rather of providing the means to sustain great weights on the mere exterior walls of buildings, in which perpendicular supports cannot be applied, of such walls being at great distance from each other. ares,

In respect to what has been already communicated upon this very subject, I find no fault with the individuals who have made those for tempts, because they are entitled to public gratitude for

tions, whether those exertions have been successful or not; but I consider that they are unsuccessful; because they consist of mere show, unaccompanied by anything in the shape of demonstration, which savours too much of the superficial; and it is therefore my intention to put the question in that shape as to be either in itself demonstrable, or which shall require an absolute demonstration to controvert it.

Explanation of the figure.



a is a beam of wood or girder to be trussed, lodging on the walls *h*. *b g b* a wrought iron plate or bar, lying on the beam, and attached to iron *levers, b, c, d,* by pivots *b*. These levers are attached to the ends of the beam by iron plates *i*, which are *fulcra*, *c* being the centre. To the lower extremity or pivots *d* of the *arm c d* is attached a bar of iron *l* at each end, and these are connected by pivots *e f* to a similar bar *m*, and are kept below the beam by cast iron blocks *k*.

Now let any weights *g* be placed on the beam *a*— if the weight cause the beam and iron rod *b b* to bend, the points *b* of the *arms c b* must approach each other, or the rod must elongate; but if the iron elongate except by its mere elasticity, or by its chemical union with different portions of caloric it is useless, and not of sufficient strength. Supposing, therefore, that this bar is of sufficient strength, I say that if it bends, the points *b* must approach each other. If so, then the points *d* must recede from each other; and if they do so, the points *f* and *e* will elevate the blocks *k*, and, consequently, the beam also. Now it is very evident that this is impossible, because if this be the case it can *ascend* and *descend* at the same time. There may, indeed, be a slight latteral compression of the beam between the blocks *k* and the weight, and this will increase the strength of the beam, in enabling it the more firmly to sustain the horizontal pressure on its ends; for it is evident that the weight is chiefly transferred to the pivots *c*. By making the arms *c d* longer than the arms *c b*, the necessity for strength becomes diminished for the lower bars, and increased for the upper, in proportion to the product of the power exerted at *d*, multiplied by the length of the arm *c d* to that of the weight *g*, multiplied by the length of the arm *c b*, this being a lever of the first kind.

It is proposed to have two sets of bars thus connected, about two or three inches from each edge, both sets being attached to one pivot *c* at each end; the iron levers *b c d* being made the whole breadth of the beam, with two apertures to receive the ends of the two sets of bars, and the block *k* to be also

the whole breadth of the beam, and equally acted upon by both sets of bars, and the plates *i* to cap on, and be fastened with strong iron bolts.

To discuss the merits and demerits of the projections of others upon this subject would occupy too much space, though, from the great importance of the subject, I feel strongly tempted to dilate; for the present, however, I shall conclude by only making a few observations on the strength of iron.

We are informed that by some experiments made by *Lieut. Dephoe* some iron was found capable of sustaining about 80 tons suspended, for each inch of area; and others only 47½ tons to the inch.

The former of these results should be rejected altogether, as being entirely beyond the general strength of iron; and may perhaps be an error.

Mr. Telford at *Mr. Brunton's* chain cable manufactory, found both Welsh and Staffordshire iron to sustain upwards of 29 tons 5 cwts. per inch *area*: and *Capt. Brown* found iron to sustain 25 tons to the inch *area*; but none of these results should be estimated upon for weights to be borne in the ordinary latteral manner, as it is not possible so to adjust the weight as to give a mere exertion longitudinally; some 8 or 10 tons to the inch *area* will be a much safer estimate, I remain, Sir,

Your very humble servant,

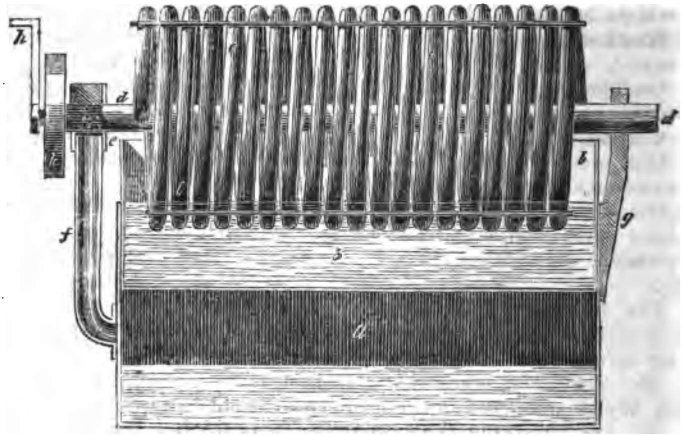
WILLIAM GUTTERIDGE.

PATENT IMPROVEMENTS IN REFINING SUGAR,

By J. CLELAND, of London.—*Enrolled July*, 1828.

A BETTER title to this patent would have been for "an improved method of evaporating or concentrating syrups and other fluids;" for to this part only of sugar refining does the invention apply, and not to the purification or refinement of sugar. The principle of the invention consists in continually exposing a thin *film* (if the expression may be allowed) of the liquid to the joint action of heat and air, and by that means effect a rapid evaporation. The apparatus consists of a convoluted worm of great length heated by steam in the interior, which is made to revolve horizontally upon its axes, partly immersed in the liquid under evaporation, which is thereby constantly taken up by it in the thinnest possible stratum, and being in contact with the hot surface of the metal, the aqueous portion of the matter is quickly formed into steam, and carried off by the surrounding air.

a is the boiler or vessel affording steam, which may therefore be imagined as set over a furnace: *b* is a shallow vessel containing the syrup to be concentrated, and so placed upon the boiler as to form the top or cover to it: *c c* is the worm supported by stays upon an axis *d d*, which has a cavity at each end communicating with the worm. One end of *d* is supported in a stuffing box *e* upon a hollow arm *f*, which communicates with the boiler, and is pierced with



numerous small holes in that part which turns in the stuffing box; the other end of the axis *d* is supported by a solid arm *g*, and is open at the extremity for the emission of the steam, after it has passed through the numerous coils of the worm. The axis may be turned by a winch *h*, or by a band passing over the pulley *k* receive its motion from any convenient prime mover.

By this excellent arrangement it will be seen that the steam in the boiler acts upon the bottom of the evaporating pan and raises the temperature of its contents; at the same time it passes by the hollow arm *f* through the small apertures in the axis *d* into the worm *c*, herein it traverses through all the turns, and escapes finally at the opposite end of the axis into the atmosphere. The lower part of the worm reaches to but a small depth in the syrup, and by turning the worm every portion of it becomes covered with the liquid, and lying in contact with an extensive heated surface vapour is given off, which is quickly absorbed by the surrounding atmosphere.

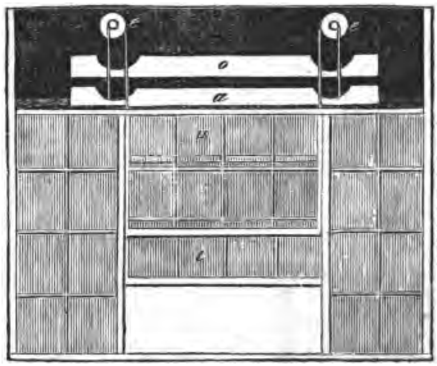
Our readers will perceive that this apparatus is equally suited for the evaporation of all other saline solutions, extracts, &c., and they will, we think, agree with us that it is a very elegant and economical apparatus for those purposes.

IMPROVED METHOD OF HANGING SASH WINDOWS IN PECULIAR SITUATIONS,

By W. Lockart, of 59, Poland Street.—*Model in the National Repository.*

One of the principal objections to sliding sashes in shop windows is the necessity in most cases of making a broad casing for the balance weights to pass up and down, which excludes the light, and so much space for the exhibition of goods, and is besides unsightly, according to the prevailing taste in those matters. To obviate these objections, sliding sashes have sometimes been made with a long train

of pulleys and lines to carry the weights to a distant situation, where there would be the least incumbrance. The inventor of the present contrivance has, however, very ingeniously contrived to place the weights in a horizontal position above the window, which is a very convenient situation, and the means adopted for the purpose being very simple, renders them not liable to get out of order.



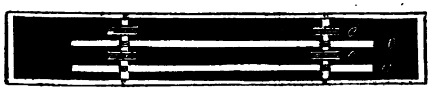


Fig. 1 represents an elevation, and fig. 2 a plan, the letters in each referring to similar parts. *u* is the upper sash, closed; *l* the lower sash partly opened; *a* the weight of the upper window; *o* the weight to the lower window; *e e* are the pulleys on which the lines run. The dark space above the window has been drawn too large in proportion to the other parts, but with the view of shewing the arrangement more clearly. When the lower sash *l* is pulled down, the weight *o* is drawn close up under the pulleys, the curved pieces being cut off of the weights for that purpose. When the upper sash *u* is drawn down, the weight *a* is drawn up close to the pulleys.

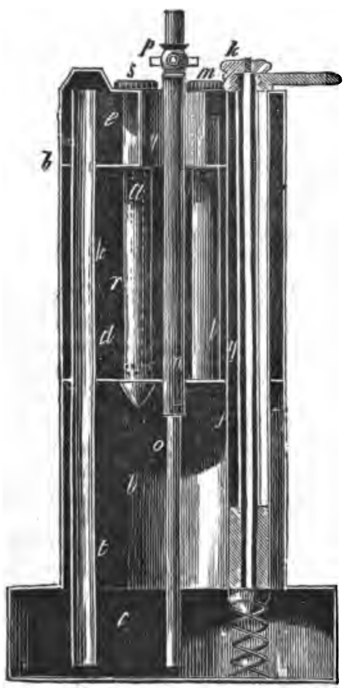
To arrange these several parts to act properly, it will be necessary to observe the depth of the casing above the window where the weights are to move; if that be (for instance) the fourth part of the range of the sashes in their grooves, then the pullies on which the lines that suspend the sashes are coiled must be four times the diameter of their axes that take up the lines from the weights. As by this arrangement the weights only move through a fourth part of the space of the sashes in the same time (by the cords passing round pullies having those relative proportions), it follows, that the weights must be four times the weight of the sashes in order to balance them. The weights in the model are made of lead, and of a flat form, as will be seen on comparing the two engraved figures, so that the horizontal depth required for them to work in is very little. The expense of the weights will be greater than those for

ordinary sashes, but they are an article of trifling cost; and it is deserving of notice, that there will be only one case or box for the weights instead of two, and that the situation above the window is more convenient for repairs than at the sides. For pastry-cooks, butchers, and market shops generally, this improvement will be found a convenience and an advantage.

PATENT IMPROVEMENT ON LAMPS.

By Renaud Florentine Jenar, of London.—*Enrolled Augnst*, 1828.

This lamp is of that description which has the oil forced up to the burner from a reservoir beneath by the action of compressed air.



The body of the lamp is divided into three compartments by two discs, *a* and *b*, *c* is the oil vessel, *d* a space to receive the overflowings from the burner, and *e* the air vessel; *f* is a condensing syringe, the piston rod of which *g* is hollow; the lower end of the syringe is closed by a valve *h*, pressed against it by springs; a rod from this valve passes through *g*, and can be screwed up by the nut *k*; *l* is a tube connecting the oil vessel *c* with the air vessel *e*, which has another aperture to the atmosphere, closed by the nut *m*; *n* is the tube for supplying the burner, having a capillary tube *o* cemented into its lower end, which descends to the bottom of the oil vessel; *p* is a stop cock for cutting off the communication with the burner, which being of the common description is not shown. The middle compartment *d* opens to the atmosphere by a short tube *q*, surrounding *n*, *r* is a tube opening into *c*; it is pierced with numerous holes at the lower end, and is closed by a valve which is secured by a nut *s*, screwing on to the top of a rod attached to the valve; *t* an air pipe descending from the top of *e* to the bottom of *c*; the air, therefore, ascends through the oil in *c*, and collects above its surface and in the air vessel *d*.

To charge the lamp with oil, unscrew the nut *m* and slacken the nut *s*, then pour in oil by the tube *q*, and it will descend into *c*

through the holes in *r*; the nuts *m* and *s* must then be screwed down again. The nut *k* must now be unscrewed from the rod of the valve *h*, and the air injected by the syringe, taking care to close the orifice of the piston rod, by applying the finger to it at each stroke: when the resistance against the valve increases, till the syringe can no longer be worked, the nut *k* must be again screwed on, and the lamp is ready for use by merely opening the stop cock *p*.

There have been many lamps upon the principle of the one just described; but from the difficulty of regulating them they have not come into general use. This difficulty arises in part from the continually varying pressure of the condensed air, occasioned by its increase of volume as the oil consumes; and also from the difficulty of regulating the supply of oil to the burner, so as neither to overflow, nor fall short of what is required. In a lamp invented by Mr. Mackell, a piece of cotton is introduced through the bore of a cock, when by turning the plug the passage may be regulated with considerable accuracy. In the present lamp, the patentee effects this by a capillary tube, which retards the flow of oil in proportion as it is lengthened, and this is the principal improvement claimed in the patent. The objection to this seems to be that the flow cannot be regulated at pleasure. With respect to the general arrangement of the lamp, although it is not claimed by the patentee, yet we cannot help saying it is decidedly inferior to most lamps on this principle which have hitherto been proposed; the separate air chamber, and the two tubes *l* and *t* are perfectly useless, and greatly increase the difficulty of the construction; at the same time it would be difficult to prevent the condensed air escaping by *m*. The syringe, too, would be found troublesome and inefficient; so that upon the whole we can not view the invention as an improvement. The best lamp of this principle, or rather the hydro-pneumatic principle, which we remember to have seen, is one now exhibited at the National Repository, and which was described by us in the Register, N°. 37. But the most simple and effective lamp of those which are supplied with oil from the lower part is a French invention, in which the oil is raised by two small pumps worked by a train of wheels. We propose shortly giving a description of this lamp, which possesses some very curious properties.

NATIONAL REPOSITORY.

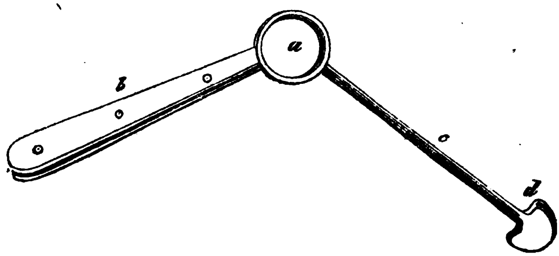
The following subjects have been recently added to the collection.

A curious Specimen of Carpet Weaving, by Joseph Bowyer, of Kidderminster. It consists in an attempt to represent an historical piece by the weaving of a carpet loom, and it is proposed as a substitute for tapestry. This carpet was woven above five years ago, when we saw it in Mr. Bowyer's warehouse, and gave a description of it in a early number of this work, (3, first series), from which we now make the following extract. The subject is Rubens' celebrated picture of Christ being taken down from the cross: and

measures about 20 feet by 14. This size admitting the figures to be as large as life, the effect is very striking. The colours are rich and beautiful; and the draperies of the different individuals, composing the group about the cross, have an imposing reality about them which it would be difficult to excel. We were informed by Mr. Bowyer that every part of it was woven in a common carpet loom in the usual breadths, and that the weaver had merely for his guide a small coloured copy of the picture; the taseful blending of the colours, the justness of the shadows, and the correctness of the outlines, depending upon his skill and ingenuity. Owing to the coarse threads of which carpets are formed, and their crossing one another at right angles, the outlines of the features of the faces have unavoidably a somewhat harsh and jagged appearance, which can, of course, be easily corrected by the use of the needle. Mr. Bowyer would not permit this to be done, being desirous to exhibit only the production of the loom.

A FINE SPECIMEN OF FOSSIL WOOD AND PEBBLES, considered to be antediluvian, having been found 50 feet beneath the surface of the ground in Harwich Cliff. From these fossils there have been manufactured, by a self-taught artist, several elegant articles in a highly finished style, consisting of various writing implements (which are intended for his Majesty) and a watch stand; the latter is a Tuscan pillar, of petrified oak, surmounted by a stand of petrified beech; this fossil is semi-transparent, and contains the dial, the hands and scale of which are rendered conspicuous at night by a lamp placed behind.

A NEW SURGICAL INSTRUMENT, for applying ligatures to deep seated parts.



b the handle of ivory, *a* a bright steel ring, *c* a steel stem, *d* a flat heart-shaped piece at the extremity, with a groove on its edge.

TWO LITHOGRAPHIC DRAWINGS, foreign; one is a representation of the Stadt House, Amsterdam, the other a Map of Corsica: the execution of these being in all respects equal to the finest *line engravings*, we doubt much the fact of their being *drawings*, but considered as *transfers* from copper-plate engravings to the stone; they are highly creditable to the artist, and far excel any thing of the kind that we have seen by our native artists.

SCIENTIFIC INSTITUTIONS.

London Mechanics' Institution.—On Tuesday, the 2nd of September, a meeting of the members of this Institution was held, for the purpose of electing 15 of the Committee of Managers. The ballot was closed at half-past nine o'clock, when the scrutineers cast up the number of votes for each candidate, and the chairman declared the following gentlemen duly elected.

Messrs. Burnett, Carswell, Eckstein, Ewings, Farmer, Garvey, Grover, Hemming, Holdup, Holmes, Johnson, Martin, Poole, Reader, and Topple.

On Wednesday, the 3rd of September, a quarterly general meeting was held in the Theatre, to receive the Committee's Report on the recent Proceedings of the Institution, detailing among other particulars the different courses of Lectures which had been delivered during the quarter: and stating, that on Wednesday, the 10th of September, Professor Millington would commence a course of Lectures on *Practical Mechanics*, to be continued on the Wednesday evenings; and that the Friday evenings would for the present be occupied by Dr. Gordon Smith's course on *Medical Jurisprudence*.

London University.—The courses of instruction at this establishment will, we understand, be commenced on the 1st of October next; and that the introductory lecture will be delivered by Charles Bell, Esq. which will, as is customary in introductory Lectures to Medical Courses, be open to the public.

MISCELLANEOUS INTELLIGENCE.

Hardening Steel.—From the observation of travellers, that the manufacture of Damascus blades was only carried on during the time when *north* winds occurred. M. Anozoff made experiments on the hardening of steel instruments, by putting them when heated into a powerful current of air, instead of quenching them in water. From the experiments already made he expects ultimate success. He finds that for very sharp-edged instruments this method is much better than the ordinary one, that the colder the air, and the more rapid its stream, the greater is the effect. The effect varies with the thickness of the mass to be hardened. The method succeeds well with case-hardened goods.—*Lancet.*

New Mechanical Carriage.—A person named Walker, residing at Little Coxwell, Berks. has invented a mechanical carriage, not on the principle of steam,—the least possible velocity of which is twelve miles an hour.—*London Weekly Review.* (hem!)

Enormous Magnifying Power.—At Hartford, in America, there is exhibited a solar microscope possessing a magnifying power of from three to four millions. When examined through this extraordinary

instrument the white mealy particles on figs are discovered to be living objects, and appear to be $2\frac{1}{2}$ feet in length; the sting of the common bee seems 14 feet long; and hundreds of snakes of from 6 to 8 feet are seen playing their horrible gambols in two drops of vinegar.—*Ibid.* (hem! hem!)

Goosberry Acid,—A French chemist, M. Tilsoy, has succeeded in preparing a vegetable acid, equal in quality to the citric or lemon acid, from bruised green gooseberries. The process is somewhat complicated, depending on saturating the rough malic acid with carbonate of lime, which is to be again decompounded by the addition of sulphuric acid, and the remaining liquor, containing the citric acid, to be evaporated to crystallization. The new acid, it is said, can be manufactured and sold for less than half the price of the citric acid of the shops.—*Jour. de Phys.*

Ostriches—impart a lively interest to a ride in the Pampas. They are seen sometimes in coveys of twenty or thirty, gliding elegantly along the gentle undulations of the plain, at half pistol shot distance from each other, like skirmishers. The young are easily domesticated, and soon become attached to those who caress them; but they are troublesome inmates; for stalking about the house, they will, when full grown, swallow coin, shirt-pins, and every small article of metal within reach. Their usual food in a wild state, is seeds, herbage, and insects; the flesh is a reddish brown, and if young, not of bad flavour. A great many eggs are laid in the same nest, which is lined with dry grass. Some accounts were given which exonerate the ostrich from the charge of being the most stupid bird in the creation. For example, the hen counts her eggs every day. This has been proved by the experiment of taking an egg away, or putting one in addition. In either case she destroys the whole by smashing them with her feet. Although she does not attend to secresy in selecting a situation for her nest, she will forsake it if the eggs have been handled. It is also said that she rolls a few eggs thirty yards distant from the nest, and cracks the shells, which, by the time her young come forth, being filled with maggots, and covered with insects, form the first repast of her infant brood. The male bird is said to take upon himself the rearing of the young, and to attach more importance to paternal authority than to the favour of his mate. If two cock birds meet, each with a family, they fight for the supremacy over both; for which reason an ostrich has sometimes under his tutelage broods of different ages.—*Gen. Miller's Memoirs.*

"The Zorrino is very common on the Pampas of South America. It is equal in size to a small rabbit, of a chesnut colour, marked on each side by two white lines. Its shape is elegant, but it emits an intolerable odour; and at every passer-by it darts with unerring aim, a liquor so pestilent, that dogs if sprinkled with it, will howl and roll themselves on the ground as if scalded. This fluid shines in the night like phosphorous. Although this animal is small and weak, it may be considered the terror of the plains. It is dreaded by tigers, lions, mastiffs, and every animal as well as human beings.

Whoever desires to possess its beautiful skin, must, in order to catch it without injury to himself, take it by the tail, and hold it with the head towards the ground; for by this means, it loses the use of the muscles which enable it to emit its pestiferous defence," 150, 2.—*Ibid.*

The Cordilleras des Andes.—"It is impossible to convey an adequate idea of the solitary grandeur of those immeasurable ridges, whose peaky summits seem to pierce the firmament. The wearisome and almost never ending ascents and descents along the course of rumbling torrents, so far beneath as to be, though within *hearing*, not always within *sight*, impart a character of loneliness not common to mountain barriers, when enlivened by a few scattered human habitations. In the Cordillera it is a pleasure to meet even the stag-like gaze of the *guanaco;* and equally a relief to look at the *condor*, as, with unfluttering wing, it floats almost movelessly above. The snow in some of the highest table-lands is difficult to pass, because it dissolves in such a manner as to leave a surface like fields of sugar-loaves. Mules frequently sink to the girth, and surmount these obstructions with great toil."—*Ibid.*

There is the following brief notice of the Andes sunsets: "Sudden changes of temperature were felt at Las Tablas in the course of twenty-four hours. At noon Fahrenheit's thermometer would stand at 85°; at sunset a breeze arose, and the mercury sunk to 65°. Before this black clouds appeared to rise directly out of the ocean, and were seen flying towards the summits of the Andes, which attracted and intercepted them. Perhaps in no other country is the sun seen to set in so much glory, For a long time after he has sunk below the horizon, he still gilds the summits of the mighty wall of the Cordillera; broken masses of clouds, magnificently tinged, impart to the sun a degree of splendour absolutely inconceivable." —*Ibid.*

"Eau de Cologne."—We extract from a Journal of Travels, by A. B. Granville, M.D. the receipt for manufacturing *Eau de Cologne.* —"Take of the essence of bergamot, lemon peel, lavender, and orange-flower, of each one ounce; essence of cinnamon, half an ounce; spirit of rosemary, and of the spirituous water of melisse, of each fifteen ounces; strong alcohol, seven pints and a half. Mix the whole together, and let the mixture stand for the space of a fortnight; after which introduce it into a glass retort, the body of which is immersed into boiling water contained in a vessel placed over a lamp, while the beak is introduced into a large glass reservoir well luted. By keeping the water to the boiling point, the mixture in the retort will distil over into the receiver, which should be covered over with wet cloths. In this manner will be obtained pure Eau de Cologne."

Sierra Leone.—"Colonel Denham is dead. In the vigour of manhood, in the very height of moral and intellectual activity, the governor of Sierra Leone has been cut off. Governor or governed that makes no difference; one by one, or two by two, or many at a single blow, they are struck to the earth in this most incomprehen-

sible place. In beauty of situation, in all things that can fascinate the eye of a poet or painter, it is almost unrivalled. But there is a mystery in its loveliness which no human eye can penetrate; death has built an invisible temple amidst its glorious solitude; and here, if anywhere upon earth, the trembling and bewildered devotee might raise an altar to THE UNKNOWN GOD."—*Edit. London Weekly Reveiw.*

CEMETERY OF PERE LA CHAISE.—"It strikes us with astonishment to find in this field of sleep every monumental form known to the nations of the world, from the pyramid raised by Egyptian pride to the basket of flowers under which the Turk or the Persian awaits the moment of awaking. We perceive mingled together the Egyptian sarcophagus, the cenotaphs and monuments of the Greeks, the Roman mausoleums, the columbarium of the ancients in mortuary chapels and vaults, the cinerary urn, and the hideous form of the bier, torches reversed, the bird of the grave, death's heads, and crosses of every form, crowns of oak and myrtle, rosebuds, pansies for remembrance, the pelican nourishing her young with her blood, the humble tombstone at the foot of the proud mausoleum, the rude granite near the polished marble, statues of the illustrious dead mingling with those of the obscure, marble shining on a thousand tombs, a covering of straw placed by a mother to shelter the remains of her son; in fine, such a variety of form in thirty thousand monuments or tumulary stones, that you may count a hundred and fifty-nine varieties of the smaller tombs, while in more than six hundred mausoleums there are absolutely not two alike."—*J. M. Marchant. Ib.*

LIST OF EXPIRED PATENTS.

Continued from page 192.

TWISTING COTTON.—To John Buxton, of Great Pearle Street, Spitalfields, for an improved method of twisting and laying cotton, silk, &c. Dated June 5, 1814.

ROPES, THREAD, &c.—To Wm. Sellars, of Kemsey Elms, Worcester, for a method of spinning and laying ropes, lines, thread, &c. by means of machinery. Dated June 5, 1814.

STOVES.—To Grant Preston, of Burr Street, Wapping, for a "*concavious* cabin-stove." Dated June 5, 1814.

WINDOWS.—To J. S. Jorden, of Birmingham, for improvements in the sashes, &c. of horticultural buildings. Dated June 7, 1814.

GUN BARRELS.—To George Heyward, of Stourbridge, Staffordshire, for an improved method of turning rolls, and of rolling and of turning gun barrels, previous to welding. Dated June 7, 1814.

LOCOMOTION.—To Thomas Tindall, of York, for improvements in steam engines, and applying the same to the propelling of carriages. Dated June 18, 1814.

GLUE.—To Bazill Louis Mertian, of Threadneedle Street, for a method of obtaining gelatinous matter from various substances. Dated July 12, 1814.

MOTION.—To James Dawson, of York Street, Dublin, for certain means of communicating motion in or unto bodies. Dated July 16, 1814.

HINGES.—To Joseph Smith, of London, for a spring hinge for doors. Dated July 16, 1814.

PROPELLING.—To George Dunnage, of Hammersmith, for a method of rowing or propelling boats. Dated July 26, 1814.

REFINING OIL.—To H. W. Vandercleft, of 253, High Holborn, for a method of purifying whale oil. Dated July 26, 1814.

IRON.—To Anthony Hill, of Plymouth Iron Works, for certain improvements in the melting or working of iron. Dated July 26, 1814.

SALT.—To Wm. Johnson, of Heybridge, Essex, for an improved process for making salt. Dated July 26, 1814.

SHIPS, MILLS, COACHES, AND TABLES.—To Wm. Doncaster, of Charles Street, Cavendish Square, for improvements in ships and vessels, and the navigating of them; and for abstracting such powers and machinery as form an hydrostator or mill; and also a mode and combination applicable to easing the draft and accelerating the motion of carriages travelling on land; and also a dining table upon an improved principle. Dated July 26, 1814.

Correspondents will be replied to in our next.

Fig. 1.

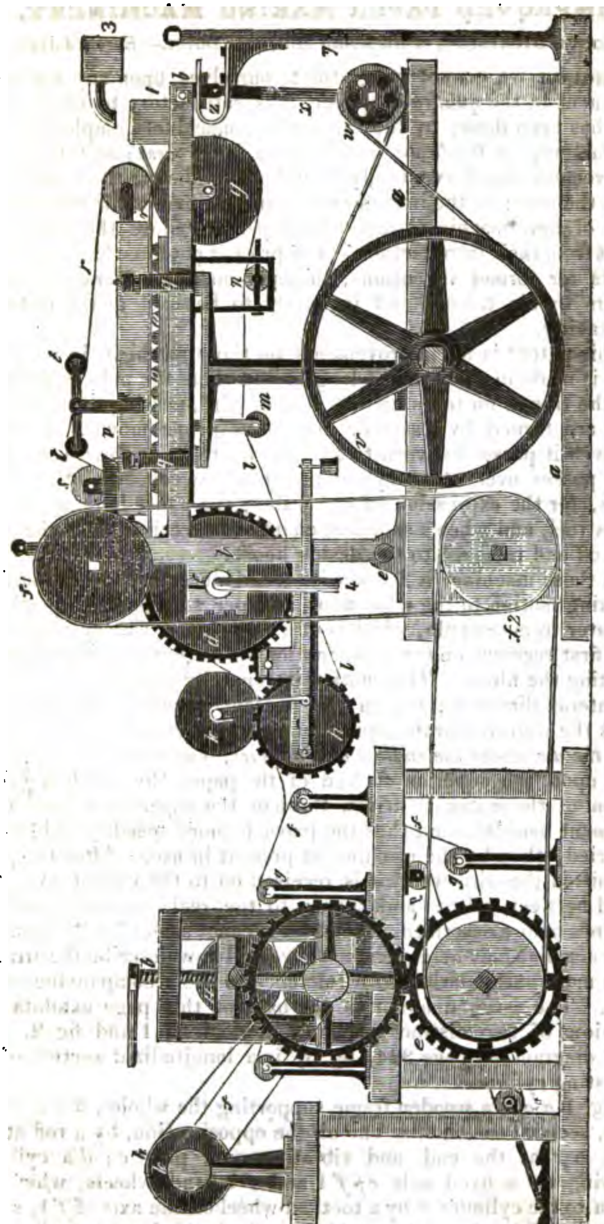


Fig. 2.

MR. GEORGE DICKINSON'S PATENT IMPROVED MACHINERY
FOR MAKING ENDLESS WOVE PAPER.

IMPROVED PAPER MAKING MACHINERY,

By George Dickinson, of Buckland Mill, near Dover.—Enrolled June, 1828.

Though we cannot congratulate ourselves upon any recent improvement in the *quality* of paper, it is satisfactory to observe that much has been done, by the various new machinery employed in its manufacture, *to facilitate and abridge the process*; and that these improvements must eventually tend both to better the quality, and lessen the cost: as the inventors must be reimbursed for the great expense of new machinery and letters-patent before the public can benefit from their introduction. The present patentee has had several patents for former inventions, in paper-making apparatus, and he appears by his talents and ingenuity to be well qualified for the undertaking.

This patent is for improvements on those machines in which the paper is made in a continued length. In them the pulp is delivered from the trough on to an endless web of wire, passing over cylinders which are turned by steam or any other prime mover. From the wire-web it passes between two rollers on to an endless web of felt, which passes over other cylinders, and between two other heavy rollers, for the expression of the water; the paper is thence wound upon a reel, and when a sufficient quantity is received on it the paper is cut off and removed to the drying house.

In those machines it is likewise found necessary to communicate a shaking motion to the wire-web, in order to separate a portion of the water from the pulp, which is of a very thin or watery consistence when first received on the web, and for the further essential operation of felting the fibres. This motion is generally given in a horizontal and lateral direction; but in the present machine Mr. Dickinson causes the web to vibrate rapidly in a *vertical direction*, and *by rarefying the air under the endless web of wire*, cause the atmosphere to press upon the superior surface of the paper, by which a further portion of the water is driven through the paper into the rarefied apartment beneath, and thus the paper is more speedily and effectually dried, than by the machine at present in use. After the paper has quitted the wire-web, it is received on to the web of felt, then passed between rollers and thence to the reel, as in the ordinary machines before described. From this account somewhat of the nature of the machine may be understood; we will now describe the arrangements more particularly, with reference to the accompanying engravings. The large diagram on the back of this page exhibits side elevations of two distinct machines marked fig. 1 and fig. 2. The small diagram on page 324, fig. 3, is a longitudinal section of the exhausting cylinder.

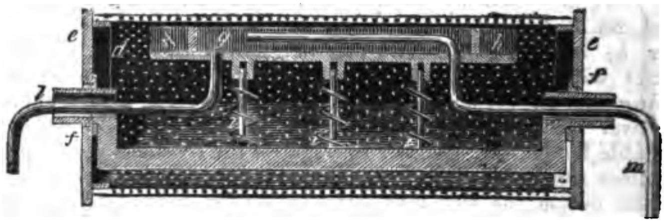
Fig. 1 *a a* is a wooden frame supporting the whole; *b b b* an iron frame, secured to a similar one on the opposite side, by a rod at top, and a bar at the end, and vibrating on a pivot *c*; *d* a cylinder, revolving on a fixed axis *e*; *f* 1 and *f* 2 band wheels, which give motion to the cylinder *d* by a toothed wheel on the axis of *f* 1, shewn by dots, which takes into another toothed wheel on the cylinder *d*;

g a cylinder revolving in pivots, supported by the frame *b b*; *h* a roller, set in motion by the pinion (shewn) driven by the toothed wheel on *d*, and which takes into another wheel on the end of the roller *h*; *k* another roller turning in grooves by being placed in contact with the revolving roller *h*; *l l l* an endless web of wire passing over the cylinders *d* and *g*, also betwixt the rollers *h* and *k*, and over the tightening rollers *m* and *n*, the latter of which is moveable by a screw, in order to regulate the tension: *o o*, a series of rollers supporting the wire web, and revolving upon spindles, in notches cut in the side rails, attached to the frame *b b*: *p* a stout piece of brass, called the *deckle*, placed on each side of the machine, over the wire web, and supported by the cross bars *q q*, which can be raised or lowered by screws in side pieces attached to the frame *b b*; *r r* the deckle straps, revolving over pullies attached to each end of the deckle, also over similar pullies on the axis of *f* 1, and under a pulley *s*, dipping into a vessel of water; the straps confine the pulp at the sides of the web, and regulate the width of the paper, which is according to the distance the deckles are asunder; *t t* tightening rollers, to tighten the deckle straps; *v* a large band wheel, driven by the prime mover, and driving the smaller band wheel *w*; the latter carries a crank (not seen) set three-eighths of an inch out of the centre of the axis of the wheel, but which eccentricity can be altered at pleasure; *a*, a connecting rod attached to the crank, and to the frame *b*, causing the latter to rise and fall three-quarters of an inch at each revolution of the wheel *w*; *y* an iron stand, and supporting the spring *z*, upon which the frame *b* strikes at each descent of the connecting rod *x*, and thus assists the crank. 1 a pulp box attached to the frame *b*, and extending the whole width of the wire web; to the front board is attached a piece of leather, which descends on to the wire web, and distributes the pulp equally over the web; 2 a thin piece of board set edgeways upon the wire web between the deckles, and keeping back the bubbles of air and water in the pulp; 3 a fixed pulp box which feeds the box 1, and regulates the quantity therein. 4 a pipe leading from the cylinder *d* to the air pump.

Fig. 2, *a*, a metal roller revolving on bearings, which can be raised or lowered by the screw *b*; *c* another roller revolving in a fixed bearing; this roller is set in motion by the toothed wheel *d* on its axis, which is driven by the wheel *e*, the latter receiving its motion from the prime mover. *f f* an endless web of felt, passing round the small rollers *g g g*, and between the rollers *a* and *c*; *h* the reel, turned by a pulley *k* on its axis; the latter is driven by a band passing over it and a pulley on the axis of *c*.

The operation of the machine is as follows:—the pulp flows from the box 3 into the box 1, thence is distributed by the leather on to the wire web; on arriving at the cylinder *d* the paper receives a considerable degree of pressure upon its external surface from the atmosphere, owing to the air being rarefied in the interior of the cylinder by means of an air-pump attached to the pipe 4; and the paper is thus deprived of the principal part of its water. The continuous sheet of paper then passes between the rollers *h* and *k*, and

Fig. 3.



thence on to the endless web of felt, when the remaining water it contains is pressed out by the rollers *a* and *c*, fig. 2, preparatory to its being coiled upon the reel *h*.

Fig. 3 a section of the cylinder *d*. *d* is the exhausting cylinder, of brass, and pierced full of holes; *e e* end pieces bolted to *d*, and carrying toothed wheels upon their peripheries; *ff* a hollow fixed centre upon which *d* revolves, and bent into the form of a crank; *g* a trough, composed of an iron bottom with wooden sides, and having two moveable end pieces *h h*, which are set to the width of the paper; the whole is covered with leather; this trough is supported by the standards *i i i* fixed into the axis *ff*, and is pressed by spiral springs against the cylinder *d*; *l* a pipe fitted into the bottom *g*, the outer end plunging in water. *m* a pipe pierced full of holes, and leading to the air-pump.

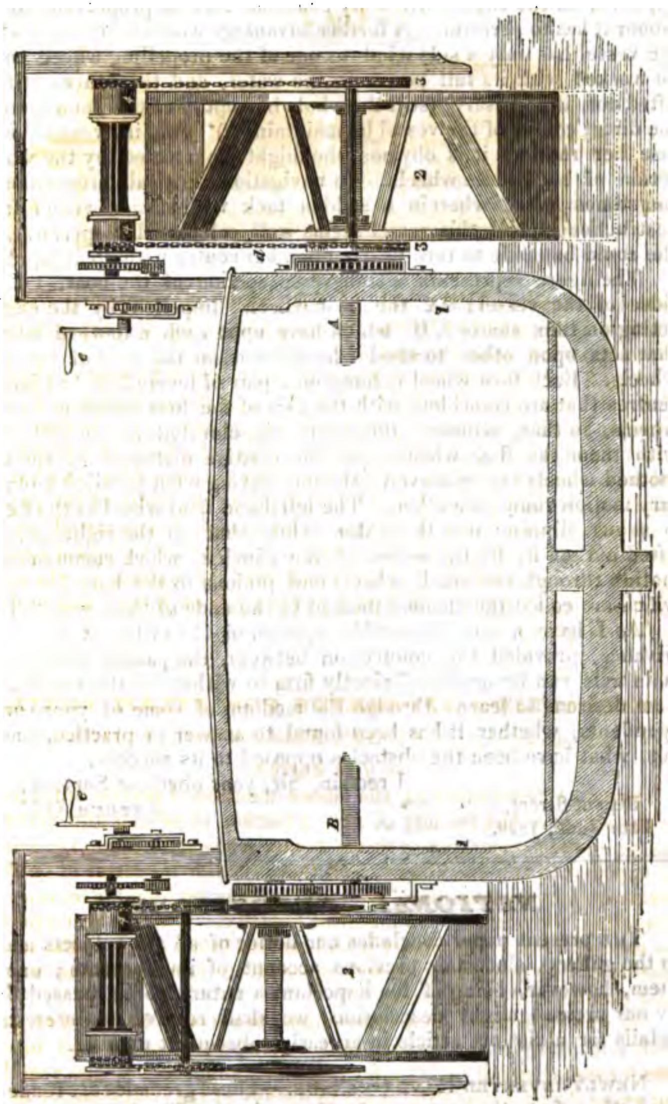
PROPELLING APPARATUS FOR STEAM BOATS,

By Mr. Jonathan Dickson, of Holland Street, Blackfriars.

TO THE EDITOR.

Sir,—A few years ago the above-mentioned person introduced to the notice of the Society of Arts a method of raising and lowering the propelling apparatus of steam-boats, without stopping the engine or any part of the machinery, and thereby allowing them to enter at pleasure just so deep into the water as may be found necessary for propelling the vessel at its intended velocity. This he accomplished by means of a sun and planet wheel motion being given to the second motion of the machinery, which causes it to move partly round the first motion or driving power.

It was considered that this contrivance would be found of great utility in those steam vessels that carried sails, and afford to such the means of going to sea; for instance, suppose a steam vessel to be going direct against the wind by means of the whole power of her steam engine, and that the wind should change and become favourable, the propellers may by these means be immediately raised out of the water, and the vessel allowed to have the full effect of the sails, thereby saving the expence of fuel. The impediment of the paddle wheels to vessels of the ordinary construction is such, as to render sails rather an incumbrance than an appendage of utility. Another



advantage appeared to result from Mr. Dickson's invention, when there might be only a gentle breeze in the vessel's favour, as the propellers might be set to work so as to take hold of the water at pleasure, and thus, by uniting the power of the wind to that of the steam, make greater progress in a given time, and at much less

expence, as the engine will only consume fuel in proportion to the labour it has to perform. A further advantage would be derived when the vessel has only a side wind, as one of the propelling wheels could be worked with its full power in the water, and the other entirely lifted out, if necessary, (still the whole be kept in motion, and thereby the direct course of the vessel be maintained.) And if a vessel should lose her rudder, it is obvious she might be steered by the varied action of her paddle wheels. In navigation, critical circumstances sometimes arise, wherein a sudden tack will save a vessel from destruction, which this vessel seems well calculated to perform, as she could be made to turn nearly upon her centre with great rapidity.

The figure represents a transverse section of the boat, 1 1 the sides of the vessel; 2 2 the float wheels, impelled by the engine acting on their shafts A B, which have upon each a toothed wheel, that acts upon other toothed wheels fixed on the axis of the float wheels. Each float wheel is hung on a pair of levers 3 3, turning on centres that are coincident with the axis of the first-mentioned tooth wheels, so that, although the levers are elevated at one end, and with them the float wheels, yet the relative distances of the two toothed wheels are preserved; the one having what is called a planetary motion round the other. The left-hand float wheel in the figure is shown dipping into the water, while that on the right-hand is lifted out of it, by the action of the winch *e*, which communicates motion through two small wheels and pinions to the barrel 4 4, on which are coiled the chains attached to the ends of the levers 3 3.

As I have a very favourable opinion of the utility of this contrivance, provided the connection between the paddle wheels and main axle can be made sufficiently firm to withstand the resistance, I am desirous to learn, through the medium of some of your correspondents, whether it has been found to answer in practice, and if not, what have been the obstacles opposed to its success.

I remain, Sir, your obedient Servant,

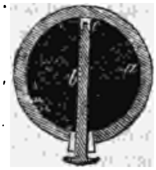
Regent Street, ARTHUR O'HARA.
14th June, 1828.

NATIONAL REPOSITORY.

THE present paper concludes our notice of all the subjects added to the gallery, since our previous account of its contents; one of them, however, being of too important a nature to be passed over by our present slight description, we shall reserve its interesting details for a distinct article in an early subsequent number.

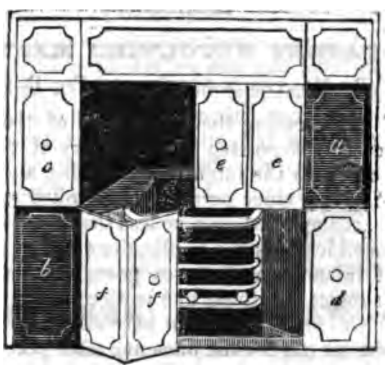
NEWLY-INVENTED HAND GRENADE.—These grenades are rendered perfectly safe to the persons who throw them. The former kind had fusees which were lighted previously to their being projected: these have no fusees, but are exploded by percussion, as will be best explained by the subjoined cut, which gives a diametrical section.

a the shell of cast-iron, supposed to be filled with combustible matter, having a conical hole, into which an iron pin surrounded by



a piece of cork fits easily; the other extremity of the pin *c* is formed to receive a percussion cap, in which is put a small quantity of detonating powder. The shell being thrown, it will naturally fall on the end of the pin projecting on the outside; the detonating powder is kindled by the blow, and the contents of the shell as well as itself are scattered in all directions. Were the Turks well provided with these grenades in their present contest with the Russians, the latter would find it no easy matter to get possession of their fortresses.

Specimen of a new and improved Manufacture of Flannel, by James Smith, of Mossley, near Manchester.—This is an exquisitely fine, and closely-woven piece of goods; it is of a good substance, and almost as soft as silk; the price is 6s. 6d. per yard.



FOLDING REGISTER STOVE.

By Mr. H. Marriott, of 89, Fleet Street.

The construction of this stove being pretty obvious from the above cut, will require but a short explanation. The grate, register, and flue are of the ordinary kind; the novelty consists simply, in adding to the front of the stove a series of small folding doors, by which the fire-place may at pleasure be wholly or partially enclosed; and by their means increase, lessen, or altogether stop the current of air, thereby operating in like manner upon the combustion of the fuel in the grate, or to the extinguishing of an accidental ignition of the soot in the chimney.

The shadowed compartments *a* and *b* are recesses just of sufficient depth to admit of the doors *c c* and *f f* when folded back, to lie flush with the other parts of the front of the stove, as is the case with those marked *c* and *d*; we have thus arranged them in the drawing, merely to render the matter quite clear to the eye, not that such positions of the doors are peculiarly eligible; (nevertheless, cases may be imagined wherein they would be so, such as screening particular objects from the influence of the fire, or increasing the combustion of a particular part of the fire, by altering the direction of the current of air.)

In lighting a fire, or in replenishing one that is low, the combustion is greatly excited by shutting the *four upper* doors, which act as a "blower." On the contrary, when a fire burns too rapidly, or is not much wanted, the *four lower* doors may be shut, which will "damp" it immediately, yet allow a great portion of the heat to radiate into the room. On retiring to bed, or wishing to leave the room in perfect security from fire, *all* the doors may be closed, when the fire will infallibly go out, for want of draught. To keep in the fire, and yet leave the room in safety, or to prevent the radiation of much heat and light, in a room (often desirable in the chamber of the sick,) the doors may be placed thus —v v—. For such chimnies as occasionally return their smoke, or in which the draught is feeble, these stoves will, we doubt not, be also found very convenient, and advantageous.

PATENT REVOLVING MASTS,

By Molyneux Shuldham, Esq. R. N.

The model representing the application of the above admirable invention to a cutter, deposited in the gallery of the Repository, we took a sketch of, with the intention of giving an engraving of it in this place; but having since perused the enrolled specification of the patent which is accompanied with no less than 65 diagrams, representing numerous modifications and applications of the principle to various descriptions of inland as well as sea going vessels, we find that we cannot do the subject any thing like justice, without devoting several pages to it, which our limits do not here admit of: we shall accordingly dismiss the matter for the present, after presenting the reader with the following brief outline of its nature.

The mast instead of being, as in ordinary vessels, a fixture, is herein made to revolve upon its axis, or turn horizontally upon its heel, carrying with it the sails, yards, and other rigging attached to it, and thereby instantly changes the direction of the vessel's motion. The power required to perform these evolutions may be the wind or manual labour, or both conjointly. As the action of the wind will naturally tend to produce the desired effect, in most cases, whatever manual force may be required to assist the operation must be very little indeed; that is to say, according to modern phraseology, the maximum of effect is produced by a minimum of labour. It will be

evident from this arrangement of the machinery of a ship, that fewer hands will be required to work it, that the running rigging may be much simplified and curtailed, and the wear and tear greatly reduced.

The patentee candidly states in his prospectus that the revolving masts are altogether inadmissible in vessels of war, and vessels of small tonnage, that carry lumber on their decks, owing to the room required for the revolving bases of the masts. We are rather diffident about disputing with such an authority as Mr. Shuldham in this matter, but we cannot help thinking that some modifications of the principle may be devised by which the difficulties (viewed by him as insuperable) may be obviated. These improvements are considered applicable to open boats, deck boats, and small craft in general; to vessels employed in inland navigation, coasting vessels, and particularly those navigating intricate channels and rivers.

The masts are variously supported according to the tonnage of the vessels; in decked boats and small vessels an iron or wooden pivot is sufficient; in larger vessels, anti-friction rollers are fixed to the revolving base, which work between two annular plates, secured to the gun-wales and deck. We must here conclude with the observation, that while we hope that ship-owners will give this subject the attention it is deserving of, we cannot help fearing that so great an innovation upon established practices will tend to retard an extensive adoption of the invention.

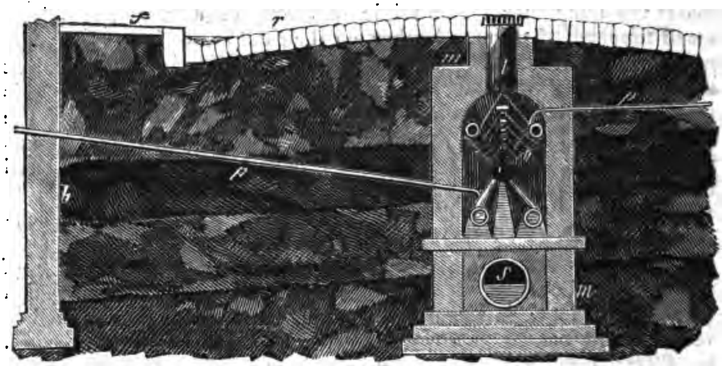
A SERIES OF EXCELLENT WORKING MODELS OF STEAM ENGINES, by Mr. Kerby, the lecturer, showing the progressive improvements and alterations which this important machine has at different times undergone, from Hero's, of Alexandria, down to that of Gurney's, of the Regent's Park.

"AN HISTORICAL ACCOUNT OF SUB-WAYS IN THE BRITISH METROPOLIS,

For the Flow of pure Water and Gas into the Houses of the Inhabitants, without disturbing the Pavements; including the Projects in 1824 and 1825.— By JOHN WILLIAMS, Patentee, Cornhill, London. Published by Carpenter and Son, Bond Street, 1828."

THE book before us is one of the most extraordinary compositions, or rather compilations, we have ever met with; but, previously to offering any remarks on the publication, we will endeavour to give the reader a general idea of the subject on which it treats. It would appear from the title of the work, that sub-ways had been actually constructed in the British metropolis so long ago as to require an historical account to recall the circumstances connected with them to the attention of the public; but it is nothing more than an historical account of various plans proposed for the introduction of sub-ways since October, 1822, at which time the author took out a patent "for a method to prevent the frequent removal of the pavement and carriage paths for laying down and taking up pipes, and for other purposes, in streets, roads, and public highways."

The nature of Mr. Williams's plan will be fully understood on inspection of the following drawing representing a transverse section of the street.



r r represents the paved road-way; *f* the foot pavement; *b* a section of the front wall of the basement story of a house, with a pipe *p* to supply water from one of the mains *o* contained in the sub-way. The opposite side of the diagram is incomplete having been cut off for want of room; the pipe *p* there shown is for the supply of the house on that side, with either gas or water. The upper pipes, which may be supposed to belong to different companies, are suspended to the crown of the arch by iron straps. The lower pipes are supported upon the floor: *m m* shows the outline of the masonry; *s* the common sewer, which has at stated distances openings into the sub-ways, but secured by air-tight doors to prevent the escape of effluvia. *l* one of the holes covered with a grating for the admission of light and the circulation of air.

The patentee proposes to build his sub-ways when practicable over the sewers, with drainage from them into the sewers; the dimensions are about 7 feet high, and 4 feet wide, but these may be varied according to circumstances. Openings are to be made at the tops of the sub-ways, or tunnel at every 100 feet, for the purpose of admitting air and light, and passages are to be made in the sides to admit inspectors and workmen. Along each side of these tunnels are to be arranged pipes to supply the inhabitants of the streets, under which they are built with water and gas. We should recommend to the patentee to add, particularly in the manufacturing districts of London, *pipes for the supply of motive power,* on the principle of the pneumatic engine lately patented by Mr. Hague, and described in our 26th number, N.S.

The time may not be far distant, when an inhabitant may have his house supplied with a motive power equal to so many men or so many horses, with as much facility, as he can at present be supplied with a given quantity of gas for the purposes of illumination; and the author may yet have an opportunity of employing such a power

in his excellent manufacture of patent ledgers and other account books.

Amongst the advantages enumerated by the patentee to be derived from the introduction of sub-ways, may be noticed the facility with which a line of pipes can be deposited along a street without breaking up the pavement, and the consequent annoyance to the inhabitants, obstruction to the passengers, and detriment to the stability of the roads; the immediate access at all times to inspect the pipes, effect the requisite repairs, or obtain an additional supply of water, in cases of fire, and better opportunities of repairing or cleaning the common sewer, whether it be situated underneath or alongside of the sub-way.

That a scheme of this kind is practicable, and would be of considerable utility when executed, we have not the smallest doubt, but that it would, at the same time, be a remunerating speculation to those who might complete such an undertaking not being so apparent to us, we leave the the solution of the problem to Mr. Williams himself, as he has published a large 8vo. volume principally, if not entirely, devoted to its solution.

Having thus briefly detailed the nature and intention of the author's patented invention, we shall proceed to describe as briefly his literary production, in which he has contrived to exhibit an immense quantity of information, chiefly official documents, which will be found of the greatest importance not only to persons engaged in large undertakings similar to that he had in view, but will at the same time be found of general utility. He commences by stating that great annoyance is experienced by the inhabitants of London from the defective state of the street pavement, which he considers arises principally, from the frequent necessity which at present exists of taking it up to get at the sewers and pipes under the streets; and he strengthens this opinion by copious extracts from different authors who have written on the state of the street pavements, including the paving act of 1823, and an account of the money collected and paid for paving, cleansing, lighting, &c. the streets of the city of London, during the seven years, ending 1822; by which it appears that the average annual expense of these years was £26,330 : 2 : 9. He then gives the specification of his patent, and describes with much minuteness various attempts to get the government to take up the subject; or to form a joint stock company to carry his plan into effect, all of which proved unsuccessful, from causes which he afterwards explains not to have proceeded from any defect in his invention.

(To be concluded in our next.)

DESCRIPTION OF THE MODE OF HEATING ROOMS.

By Archibald M'Alister & John Iggett, of Ross County, Ohio.— *Patented December* 15, 1827.

We the subscribers, do hereby declare that our improvement in the art of warming and heating the various rooms and apartments of houses, is of the character described in the following words, that is

to say : A cast or sheet iron stove, of any required size or dimensions, is to be enclosed on the sides, ends, top, and bottom, with marble slabs, either polished or in the rough, as with brick, or other kinds of stone. This covering may be in thickness, from one to any number of inches, though it is believed, that a thickness, of from one to three inches, will best answer the ends for which it is designed; it is not to be in contact with, but at a distance from the stove, of from one to any number of inches, though it is believed, that a distance of from one to three inches will accomplish best the object in view. The several plates on the side, ends, top, and bottom, are to be so made and fitted together, as entirely to enclose the stove, with the exception of the spaces hereinafter mentioned to be left, viz :—The plates around the sides and ends, are not to extend upwards so far as to be in contact with that over the top of the stove, but a space is to be left between the same, of from one to three inches wide, entirely around the stove, and the top plate to rest on marble, brick, or other stone, blocks or pillars, standing on the side and end plates—a space is also to be left on the top of the stove, for the pipe to pass through. If the door be in the end of the stove, a space should be left accordingly, in the front plate. The plate in front may be left off entirely, and in that case, the ends of the upper and under side plates of the stove are to be connected, by means of marble, stone, brick, or any other durable material, occupying the intermediate spaces ; a tube of tin or sheet iron, communicating with the air outside of the house, or at least with that out of the room in which the stove stands, is to pass up through the floor, and through the lower plate of the covering above described. Thus constantly supplying the space between the stove and the casement surrounding it, with fresh air, which, as it strikes the stove and becomes heated, passes in a continual current, through the space left, as above mentioned, around the upper edge of the stove, out into the room where the stove stands. The foundation upon which the stove is to stand, and the pipe accompanying it, may be the same as those of stoves now in use. Instead of leaving a space as above described, between the upper plate and those around the sides, said plates may be made to come in contact with each other, and in that case, a number of holes are to be made through the upper plate, for the air to pass through ; and the upper plates may, if wished, be cast iron, and side holes left in them, at the time they are cast.

For the purpose of burning the Lehigh or other coal, which is difficult of ignition, the stove may be of such a shape, that a lateral or horizontal section of it, may be either circular, square, or oblong, with the door or aperture through which the coal is to be put into the stove, on the upper part of one of the sides or end plates : for the purpose of giving a draft to it, a number of small holes are to be left through the lower edge or corner of the same, and a few also through the bottom of the stove, through which the air is to pass from without, into the stove. The stove is then to be encased, on all sides, in the manner above described, with marble, brick, or other stone, leaving a space as above mentioned, for the heated air to pass out

into the room. A tube, like the one above described, is to accompany it, for the purpose of forcing the air out into the room; and for the purpose of giving an additional draft to the stove, another tube or tubes similar to the first, is to pass up through, and communicate the air to the above mentioned holes, around the lower edge and bottom plate of the stove. The pipe may be placed upon it as with stoves now in use; or if a greater draft is wished, the pipe may pass down into the stove, so that its lower extremity shall reach near to the coal in the stove, and in the latter case, the portion of the pipe passing into the stove, must be of cast iron. To catch the cinders and ashes falling through the holes in the bottom of this kind of stove, a space is to be left at the bottom of one of the ends or side plates, of two or three inches wide, into which, a sheet iron draw is to be inserted, of dimensions fitted to fill said space.

The principal advantages of stoves thus improved, over all others now in use, are the greatly diminished quantity of fuel which they require, their increased power of throwing out heat, and the greater uniformity of temperature which they produce in the air of the room where they stand. The improvement consists in the application of the above described tubes and casements, to the ordinary stoves now in use, and the principles therefore, which distinguish this improvement, may be applied to stoves of any kind, shape, or dimensions.

Stoves thus constructed, combine, it is believed, all the important advantages of the Russian, and other stoves now in use, with those which peculiarly distinguish the above described improvement superadded to them.

ARCHIBALD M'ALISTER,
JOHN IGGETT.

SPECIFICATION OF AN IMPROVED MODE OF IMPRESSING FIGURES ON THE ROLLERS OF CALICO PRINTERS, BY ETCHING.

Invented by DAVID H. MASON, & MATTHIAS W. BALDWIN, of Philadelphia.

THE former method of making these mills was by punches, with figures of rosets, leaves, circles, pins or other figures. The punches having on them the figure or device required, are driven into the steel cylinders or mill, and the metal raised up by the punch is faced off; and the parts united and trimmed with a graver; or the whole figure or device was cut in with a graver.

The improvement of the petitioners consists in *etching* the device on the mill, which we do in the following manner:—A steel cylinder or mill is prepared, of suitable size, with pivots or journals, in the usual manner of making such mills; the mill is then coated with varnish, or etching ground, such as is used by engravers for covering their plates in etching; the device is then traced through the varnish or etching ground, with an etching needle, or steel point; the device being thus traced, the pivots or journals are coated with a varnish made with asphaltum and spirits of turpentine, so as to prevent the acid from acting on the mill, except where the device has been marked

through the varnish with the etching needle, or steel point; the mill is then immersed in a prepared acid, in making which, we use the same kind of acid (viz. aqua fortis, or nitrous acid), which is used for etching on copper; but are careful not to have any copper in it. Our mode of preparing the acid is as follows: we dilute the acid in the proportion of four or five of spring water, to one of acid, and then dissolve it in as much tinfoil, or block tin, as it will take up, or until it ceases to effervesce; while in this operation, it must be in a bottle with the stopper out: this mixture is diluted in the proportion of from eight to fifteen parts of water, to one of the acid used in the first instance, according to the kind of work to be etched. For coarse work, the prepared acid should be strong; and for delicate work, it should be weak. This prepared acid is managed, in all respects, as nitrous acid is managed, by engravers on copper, except that generally, in the prepared acid, there are no bubbles by its action on the steel.

This promise may be performed by any of the other preparations of acid used in biting soft steel; but that above described we found to answer best.

When the mill or steel cylinder has been in the prepared acid a sufficient length of time, to bite in the figure or device traced with the etching needle or steel point, to the required depth, (which is ascertained in the usual way, by scraping off the varnish from a part of the device,) it is taken out, the coating of varnish removed, and the figure or device is finished with a graver, in the usual manner of finishing etching; the mill is then hardened, and a transfer taken from it to another steel cylinder or mill, so that the figure or device etched in the first, shall be raised on the second; in order that it may be impressed on the copper cylinder, to be used in the calico printing; all which transfers are made in the usual manner, and with the usual machinery for effecting such transfers of engravings.

What we claim as our invention, or improvement, is the *etching* of figures, or devices, on steel cylinders or mills, to be transferred to copper rollers for calico printing. We claim nothing more.

In testimony that the above and foregoing is a true specification of our said improvement, as hereinbefore described, we have hereto set our hands and seals, this twelfth day of October, in the year of our Lord eighteen hundred and twenty-seven.

DAVID H. MASON.
MATTHEW W. BALDWIN.

Franklin Journal.

THE COLISEUM.

[*From the London Weekly-Review.*]

The vast building in the Regent's Park, known generally by the name of the Coliseum, has now for some years been an object of considerable curiosity. Few have been admitted within the interior, and of those few no one has yet taken the pains to draw up a correct account of the magnificent structure, or give a description of the unrivalled panoramic view which it contains. For the present we ourselves shall pass very rapidly over the building, and confine our-

selves chiefly to the picture—the largest that has ever yet been painted.

Most of our readers are acquainted with the principle of the panorama; and therefore we need only to observe, that in the present instance, the point of view is the summit of St. Paul's, from whence Mr. Horner, with the enthusiasm of genius, made the original sketches. From this elevated position we obtain a view of the mighty city, a world of streets and buildings, stretching away into the country, and bathed in the light of the morning, the spectator will perceive that he is up before the majority of the citizens, by the thin columns of smoke that ascend from the chimneys, and appear to be creeping lazily over the city before a faint breeze. Later in the day London, being wrapped in clouds and obscurity, looks more like the crater of a smouldering volcano, than the queen of cities. Looking towards the west, we discover in the near foreground the two turrets of St. Paul's, which cover nearly one thousand feet of canvass. The eye then pursues the principal streets and the river, until London is lost in the country; and discovers Harrow, Richmond, and the royal towers of Windsor, with all the villas and villages with which the environs of the modern Babylon, more wonderous, perhaps, than the ancient, are sprinkled. On the eastern side, following the windings of the river, we discover the London and India Docks, Greenwich with its magnificent hospital, Woolwich and the other places on the Thames, as far almost as the Nore, where the river mingles with the ocean. But we can particularize no further: all the hills, parks, villas, &c. which adorn the beautiful country round the metropolis, are reproduced upon the canvass, and that with an exactness and fidelity altogether surprising. The reader may, perhaps, form some idea of this vast picture, when we inform him that it covers upwards of forty thousand square feet, or nearly an acre of canvass; that the dome of the Coliseum, on which the sky is painted, is thirty feet more in diameter than the cupola of St. Paul's, which was covered with paintings by Sir James Thornhill; and that the circumference of the horizon visible from the point of view, is nearly one hundred and thirty miles.

The spectator who shall view this magnificent panorama, without being previously informed of the difficulties with which the able and indefatigable artist, Mr. E. T. Parris, had to contend, however he may be struck with the *tout ensemble*, will hardly be able to appreciate the merit of the work. In the first place, as no one individual could accomplish such an undertaking in a sufficiently short period, many artists were necessarily employed; each of these had his own peculiar style, and taste, and notions, which of course he would not depart from; when each of the assistant artists, therefore, had finished his part, it was necessary for Mr. Parris to go himself over the whole, retouch every thing, and reduce the various parts into harmony with each other. This he has effected in the most admirable manner, so that at present the productions of numerous dissimilar pencils appear like the creation of one man.

Another, and perhaps still greater difficulty, was to preserve the true perspective from so elevated and novel a point of view, and on

curved canvass; for, by the closing of the dome, that part of the picture upon which the greatest distance was to be represented, is in reality brought nearest the spectator. We must observe, however, that these difficulties have all been surmounted, and that the illusion is most complete. The boldness and breadth of the buildings in the foreground contrasts admirably with the minute and elaborate handling of the middle distance and the far background, where objects melt away in aerial perspective into a dreamy indistinctness, and mingle, as it were, with the sky.

The description of the building itself, which will be opened in about four months, we shall reserve for a future opportunity, as at present it has not been determined to what purpose many of its parts are to be applied. We may remark, however, that among the principal objects of interest which it contains, are a cascade and Alpine scenery, viewed from a Swiss cottage, fitted up with extraordinary elegance; an aviary to be filled with rare singing birds; and a conservatory, in which the most beautiful exotic and indigenous plants are to be collected. Among those already there, we observed a magnificent specimen of the camelia japonica, nearly thirty feet high, and bearing, as we understand, every variety of that beautiful species of plant engrafted on one stem. Near this were various curious specimens of the aloe, and every known variety of the cactus.

MISCELLANEOUS INTELLIGENCE.

AMBER.—It appears that this substance is found by the inhabitants on the coast between Palengen and Pillau, either loosely on the shore, on which it has been thrown by the strong north or westerly winds, or in small hillocks of sand near the sea, where it is found in regular strata. The quantity found yearly in this manner, and on this small extent of coast, besides what little is sometimes discovered in beds of pit-coal in the interior of the country, is said to amount from 150 to 200 tons, yielding a revenue to the government of Prussia, of about 100,000 francs. As amber is much less in vogue in Western Europe than in former times, the best pieces, which are very transparent and frequently weigh as much as three ounces, are sent to Turkey and Persia, for the heads of their expensive pipes and hookahs. Very few trinkets are now sold for ornaments to ladies' dresses, and the great bulk of amber annually found is converted into a species of scented spirits and oil, which are much esteemed for the composition of delicate varnish. In the rough state amber is sold by the ton, and forms an object of export trade from Memel and Konigsburg." *From a Journal of Travels by A. B. Granville, M. D.*

TO OUR READERS AND CORRESPONDENTS.

Some experiments decisive as to the advantages of Mr. Stevens's paddle wheels were made a few days since on the City Canal, which we shall detail in our next.

Mr. Gutteridge's favour is intended for our next.

It will be necessary for M. D. so show that his quere relates to something of greater utility than the settling of "a sharp dispute" about a ridiculous hypothetical experiment.

Mr. Forrest's communication is under consideration.

Fig. 1.

PATENT IMPROVEMENTS IN WARMING AND VENTILATING,

By Mr. George Stratton, 29, Hampstead Road, London,

Particularly adapted to Hot-Houses, Churches, and large Buildings, of every description.

Of all the departments of scientific experiment, there is scarcely any which has been so frequently investigated, under almost every possible modification, as the subject comprised under the above title. The economical use of fuel for heating large buildings has exercised the talent and ingenuity of the greatest men of this as well as other countries. The genius of the mathematician, the chemist, and the engineer, have been conjointly as well as separately, exerted, to effect this important end. Nor is the subject unworthy of their energies, since, independent of the present cost of coal, the consumption of human life whilst procuring it, and the certainty that its supply must in time be exhausted, render a judicious use of it a matter of primary importance.—Whether it be that nothing has yet been discovered applicable generally to the common purposes of life; or whether the prejudices in favour of a bright flaming fire, and the imaginary comforts produced therefrom by the association of ideas,

are unconquerable; or whether it be a combination of these causes; —nothing yet has been adopted, whereby any extraordinary saving of fuel is effected. One would imagine, too, from the pretensions of several of the proprietors of plans for effecting this object that something important had really been done; but upon inquiry it is found that either the expense of apparatus, or the questionable benefits produced, or the limitation of their uses, besides merely warming, are insuperable objections to their general adoption: and we have, therefore, been obliged to remain contented with the old-fashioned grate, which disposes of nine-tenths of the caloric by sending it up the chimney!

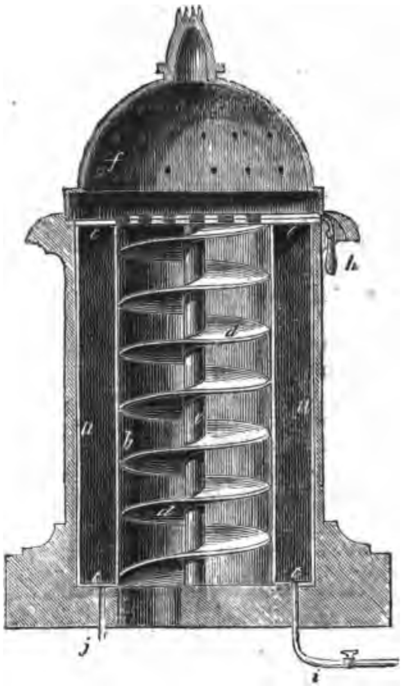
The description of the numerous modes proposed for an economical distribution of heat would form an amusing history, since every variety of form and material have been tried.—Currents by pressure, currents by vacuum, currents by streams of hot water, and streams of cold water, by steam, by smoke, and even by friction or attrition, have each undergone the ordeal of actual experiment, and generally, alas! have failed; at least so far failed as to bring the limits of their utility within a very narrow compass.

Steam seems to be generally allowed to be the best method of communicating caloric to the air in a building, and has obtained a preference over all other methods. And we shall now premise that Mr. Stratton's apparatus seems to us to be capable of communicating nearly all its caloric in the proper way; that is to say, to the air requiring to be heated.

Figs. 1 and 2 in the accompanying diagrams are representations of an elevation and section of Mr. Stratton's apparatus. It consists of an exterior tube of copper, *a*, Fig. 2, within which is a smaller tube *b*, of equal length, soldered to end plates *c c*, forming thereby a steam-tight vessel, surrounding the interior tube *b*. *d d* is a spiral apparatus of copper coiling round the upright rod *e*; the periphery of this spiral exactly fits the interior of the tube *b*, so that no air can pass up or down without taking a winding course through the spaces formed by the spiral. *f* is a semi-globe of copper perforated with holes: and *g g* are two moveable plates, in which are cut oblong apertures, so that, when the holes in each coincide, the air has a free passage through them; but when they are moved by the lever *h*, so that the holes in one are covered by those in the other, the passage is stopped and the air ceases to flow. *i* is a steam pipe for the purpose of admitting steam from a small boiler, and *j* is another pipe for allowing any water which may be formed by condensation to run back into the boiler, or elsewhere.

Steam being admitted into the compartment formed between the two tubes, by turning the cock, instantly heats the interior tube *b*, and (by radiation) the spiral *d d*, by which the air already filling the tube is expanded, and rises by its inferior gravity, escaping into the open atmosphere through the holes in the cap *f*; the air underneath rushes in to fill the partial vacuum, and in its turn becomes heated as the other; by this means a constant current can be kept up so long as the compartment is supplied with steam, but this current would

Fig. 2.



in an unimpeded passage be much too rapid in its motion to become sufficiently heated for the purpose intended. The patentee's improvement, therefore, consists in the introduction of the spiral *d d*, which causes the air (as we have said) to take a winding course, and thus traverse the whole heated surface of the spiral before its exit into the air. By this contrivance the air is made to traverse over a considerable space of heated material, whilst the steam required to act therein is confined to a very short vessel, and consequently has but a small portion of its surface exposed uselessly. It may be cased in wood or other non-conducting material on its outside if desired for ornament, or any other reason, without any diminution of its effect in warming the apartment.

The patentee has shown us some beautiful designs by which this apparatus becomes highly ornamental, and forms an elegant pedestal for a gentleman's hall.

We conceive that it will be very advantageous in hot-houses, as a fine current of air can be constantly kept up, thus possessing a considerable advantage over the hot wall, which acts upon a stagnant atmosphere, although it is well known that pure air is as necessary for the support of vegetable as of animal life.

This kind of stove appears to us to afford the most convenient and elegant means of warming public libraries, colleges, hospitals, &c.; its compact form will give great scope for the exercise of architectural taste, without detriment to its utility or effectiveness; as substances that are non-conductors of heat will do with those that are the contrary. If it is desired to prevent the *radiation* of heat, as much as possible, stone (natural or artificial) would be eligible. With a stratum of charcoal interposed between the stove and the internal casing, even glass, either cut, or of the "crystallo ceramie" kind, might be employed as the external case, with great advantage, and would produce a most splendid and unique effect. Of course any of the various metals may be legitimately used, but in employing these the artist should bear in mind that in proportion as their surfaces are rendered bright or polished, will the radiation of the heat be increased. If it is desired to produce an increase of heat in the vicinity of the stove, the metals should be unpolished; if the contrary, they should be polished.

Artificial heat may by these means be communicated throughout a large mansion or a range of building, by the use of a single close fire and boiler situated in a distant apartment; and while it might thus be made to confer perfect safety from conflagration, would cause none of the dirt, dust, or inconvenience, inseparable from our common fires.

NEW TRUSSED GIRDER,

At Messrs. Nicholson's Distillery, St. John Street, Clerkenwell.

TO THE EDITOR.

Sir,—In my article on trussing girders, I have omitted to *except* in my objections that of the London University, the principle of which is good; and I have great satisfaction in being enabled to furnish an illustration of another modification of that principle, the merit of which I believe to be the joint stock of *Messrs. Blyth,* surveyor;—*Webb,* builder; and *Bramah,* machinist.

These trusses are adapted to girders by *Mr. Webb,* to support a new *liquor-back,* containing nearly nineteen thousand gallons, on the new distillery of *Messrs. Nicholson,* of Clerkenwell; the weight of which, when full, including the back and contents, being about 100 tons.

The object I have in view, in supplying this article, is the same as I have already stated—namely, to avert, if possible, the destruction of human life by the falling of buildings; an awfully additional evidence of which has occurred since my last, by the falling of two houses in *Exeter Street;* and as this truss can be used in any building, without inconvenience, it is deserving of particular notice.

Description.—a, fig. 1, are three strong plates of cast iron, the end ones resting on cast iron blocks *b,* at the outward ends, and on queen bolts *c,* at their other ends, on which bolts the middle plate is also supported.

The parts of the queens, on which the plates lodge, are cast iron; into which, as into the end blocks, they enter a short distance (shown in the drawing) parts to the curve ends of the plates.

This figure is a *section in plan** of the girder and trusses, the plates being supposed to be split up, and the farther flitch of the girder only on.

The queens bolt through cast iron plates *d*, by means of strong wrought iron, which bolts and nuts are bisected to show that the screw and nut partially enter the castings.

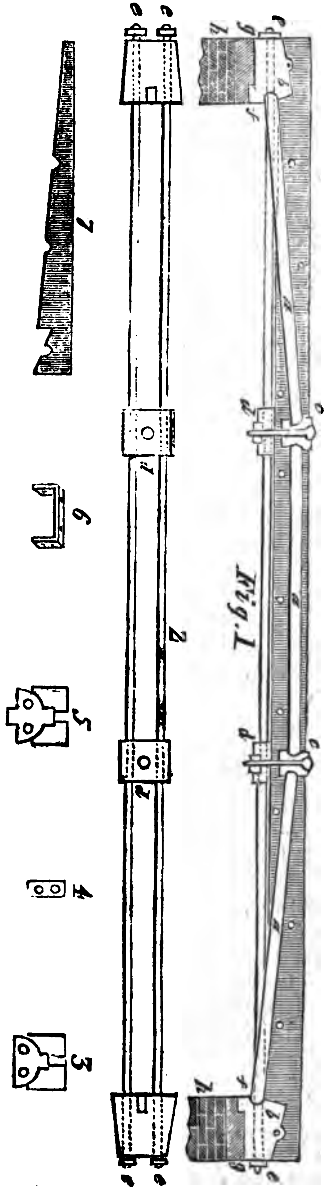
e is one of two wrought iron bars, passing through the blocks *b*, and *d*; being made fast at the ends *e*, by nuts; and finally prevented from drawing, by the ends of the bars being hammered.

The blocks *b* have protuberances *f*, which enter the bearing timbers *g*, on the walls *h*.

The dotted lines show the continuity of the bar *e*, where it is concealed by passing through the square plates *d*, beyond the end plates *a*, and through the blocks *b*, to the fastenings *e*.

The ends of the plates *a*, from the dots, are made steady by melting in of lead; which will nevertheless acquire any necessary motion in taking up the final position, when the weight is placed on the girder.

The ends *f b*, of the blocks are not vertical, but incline outwards about 10 degrees; by which the flitches of the girder cannot slip down, but must press at the angle *b*, as must also the points between *b f*, of the plates *a*, when the weight presses down



* Draftsmen call this a longitudinal vertical section. Ed.

the queens, by the part of the girder bearing on their shoulder, or on the plates *d*, thus giving the whole weight to the bars *e*, in the direction of their length, just as if the weight were suspended vertically on those bars or very nearly so; the girder being merely the rest for the base of the back. The points *o*, show where the flitches are bolted together. Fig. 2 shows the two bars *e*, from beneath, as they pass through the castings. 3 is the end with the girder trussed on: 4 is the end of the plates *d*, through which the bars *e* pass;—5 is a section of the inner part of the end block when trussed, 6 is one of the iron braces which saddle over the flitches to keep them to at top; and 7 is one of the pieces of oak which fit into the apertures between the flitches to preserve the bearing.

The bars *e*, are 2⅛ inches in diameter of wrought iron, or upwards of 3½ inches area each; and as there is no waste of power, and the weight being merely, as it were, suspended, there can be very little doubt, if the joinings be well welded, and the iron good, that one of these trussed girders would be equal to the support of the whole back; but as it would neither be possible nor desirable to use but one, all doubt will immediately vanish, as to the capability of a very few such as these supporting the weight to be placed upon them.

There is also another class of iron trusses used to girders to support a liquor back on the same premises; which are an improved modification of those proposed, and, I hear, adopted in some other places. I say an *improved* modification, because the ends of the beam are the stays, instead of a saddle above; which in my opinion, is by no means good: I also consider that there is another improvement on this truss, which consists in an enlargement of the angle made by the girder and truss; as a much less power exerted on the truss brings up the girder in the points of contact; for it is absolutely necessary that this should be done, or the truss will have no effect; and if this be done to any great degree, the girder is disposed to twist when the weight is laid on; which is one of the demerits of this truss; and that of exhausting a degree of power, in taking not only all the bearing of the weight, but also the exertion of the beam to straighten itself is another demerit; and it is very evident that such a form cannot be applicable to the general purposes of building, unless the truss be brought close to the beam, when additional power will be lost by exerting the bars, having a very small angle with the beam, to take the weight laid on; for if the truss in this position be merely put on, without being exerted, and the weight laid on the beam, and the bars be passed over a saddle on the beam, the weight will have full liberty to depress the beam in the middle, by the points of attachment on the saddles approaching each other, and thereby rendering the truss worse than useless.

In the improved modification, about one ton being exerted by the nut on each bar, will give the whole weight to the truss, just relieving the beam, and enabling it to take the weight intermediately, and to retain it in that position, by the end fastenings preventing the elongation of any part, which is not prevented when the lower angles or the ends are not secured. It has been said that one of

this sort with the truss close to the girder, has been used to sustain some brick work; but with end walls one might take away a tier of bricks from a side wall, after the mortar is once well cemented and dry, without the bricks above from descending, which proves that a wall so fixed is no criterion at all.

I remain, Sir, your very obedient Servant,
WILLIAM GUTTERIDGE.

N.B. To prove that this truss engraven is in accordance with my own views, I appeal to *Mr. Hurrel*, the Back Maker, to confirm the fact of my having chalked one on the same principle on the side of one of the backs while he was erecting it, prior to these trusses being determined upon. If more strength were desired, it can be had by increasing the size and curvature of the middle piece *a*, and by shortening its length.

PATENT IMPROVEMENTS IN PAPER MAKING,

By T. B. CROMPTON, of Tamworth, Lancashire; and E. TAYLOR, of Marsden, Yorkshire.—*Enrolled, July*, 1828.

IN our last number we gave a description of Mr. G. Dickenson's recent improvements in the making of endless wove paper; which paper being of considerably greater width than is usually required, it becomes necessary to divide the paper lengthways, in order to obtain the required width. To effect this operation in as accurate and expeditious a manner as possible, has been the object of the patentee in the machine we have now to describe, the essential parts of which are represented in the annexed diagrams.

Fig. 1 is a side elevation of the machine; fig. 2 a plan of the cutters. *a* is the roller upon which the paper, (either in the moist state in which it is delivered from the felts when freshly made or when dry,) is rolled; *b b* and *c c* are two pairs of drawing rollers, which conduct the paper, first between the circular cutters *e e*, and thence on to the roller *d*, where it is wound in its divided state.

The shaft upon which the upper cutter is fixed, is driven by any prime mover, and by means of endless bands and pullies, it imparts motion to the upper drawing rollers *b* and *c*; these two upper rollers turn the two lower, by means of cog wheels at the other extremities of their axes, which geer into each other; the upper cutter, has in like manner a toothed wheel upon its axis, which turns another toothed wheel upon the axis of the lower; none of these toothed wheels are brought into view in the drawing, to prevent confusion. By the revolutions of these parts of the apparatus the paper represented by a line *g g*, is drawn from *a* between the rollers *b*, is severed at *e*, and thence is carried by the rollers *c*, on to *d*, by means of an endless band from the latter, as shewn. In order to accommodate this movement to the increasing circumference of the roller *d*, occasioned by the paper accumulating upon it, the band pulley on *d* is a friction roller, which is set so as to allow of its slipping a little in its revolutions.

Fig. 2.

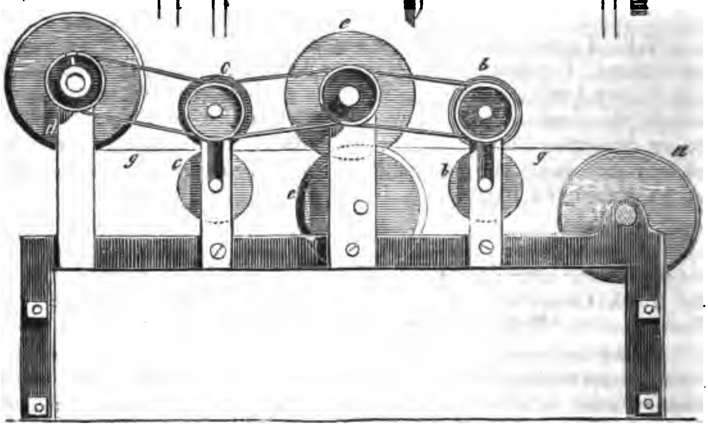


Fig. 1

It should also be noticed that the axis of the lower cutter is not quite parallel to the axis of the upper one, by which means the edges of the cutters facing the rollers *a* are brought into contact, whilst the other edges diverge, which causes the paper to be more freely delivered from the cutters. The great rapidity of this process of cutting is evident.

EXPERIMENTS WITH MR. STEVENS'S PATENT PADDLES.

We gave in our 39th N°. N.S., a description of Mr. Stevens's novel apparatus for propelling vessels, the merits of which have since been the subject of much public discussion; our own work has been the vehicle for some clever and interesting papers in the matter; we allude in particular to the contributions of Mr. E. Galloway, in our 42nd, and to that of J. M. in the succeeding number. We have now, however, something more valuable to communicate than theoretical disquisitions, some decisive comparative experiments having been recently made on the City Canal, Blackwall, with the new paddles and those of the ordinary kind.

Mr. Stevens made previously some experiments on the Thames, first with wheels of the common construction, and afterwards with those of his own, which although perfectly satisfactory to himself, he considered might not be so to others, on account of the many circum-

stances occurring in a tide river, which have to be taken into consideration, such as the changes in the velocity and direction of the current, &c., all of which must be duly estimated before a correct decision can be come to; accordingly, Mr. S. determined to repeat his experiments on the still water of the City Canal, to which place his vessel was removed for that purpose, and the attendance of the Reporters of the various journals was requested to witness them. We could not attend ourselves, but we are confidently informed that two experiments were made, one on Friday the 19th ult. with Mr. Stevens's paddles, and another on the following day, when the common wheels were substituted.

The impelling surface of the paddle was in both instances nearly equal, but with this difference, that in Mr. S.'s paddle the vertical length was the greatest, whilst the common one was (as usual) greatest in its horizontal length. The motion was communicated by eight men working a shaft and winches. Each throw of the crank carried a paddle 26 inches deep, and about 6 inches wide. The guiding rods were about 3 feet 6 inches high, and the radius rods about 4 feet 6 inches long. This modification therefore differs from that described in our 39th number, which it will be recollected had four paddles attached to each guiding stem instead of one; as also from the plan described in Mr. Galloway's letter, which shewed two paddles upon each stern. Provision is made for shortening or lengthening either the guiding or the radius rods, by shifting their pivots, so that the distance which the paddle traverses in the water, or the depth of its immersion, may be varied at pleasure, which will evidently be very convenient when used in water where the force or direction of the current may vary.

On the experiment of the 19th, the boat was propelled by Mr. Stevens's apparatus 1 mile in 13 minutes, that is to say, half a mile against the wind, and half a mile with the wind. There was not the least appearance of back-water; the canal remained as little disturbed behind the vessel, as it would have been if sails or oars had been the propelling power.

Mr. Stevens then displaced his apparatus on one side, and substituted the common wheel, by which the vessel, when left uninfluenced by the helm, immediately turned to one side by the superior power of the patent method. By this experiment the two paddles must have been worked with precisely the same application of force, consequently, an undeniable proof was afforded of the superiority of Mr. Stevens's paddles.

On the 20th two common wheels, whose extreme diameters were five feet, were tried, being worked by the same men. The boat was propelled one mile in 19½ minutes, being 6 minutes and a half more than was consumed in travelling the same distance by Mr. Stevens's apparatus.

Nothing could be more pleasing than the contrast between the action of Mr. Stevens's apparatus and the common wheel when tried in conjunction; the ripple produced by the latter being very considerable, whilst the water on the other side of the vessel exhibited

no visible agitation. The spray, too, in a few minutes after starting literally washed the gangway on the side of the common wheel, whilst not a drop was visible on the other side.

MR. COBBETT'S INDIAN CORN.

TO THE EDITOR.

Great New Street, Sept. 22, 1828.

SIR,—From the extensive circulation of your work, and it being generally considered as the most authentic source of information in the useful arts, I venture to solicit a place in its columns for some remarks on the interesting and important experiment now making by Mr. Cobbett.

From the accounts given by Mr. Cobbett in his Register, relative to his crop of Indian Corn, I was induced a few days ago to pay a visit to this farm at Barn Elm, for the purpose of ascertaining how far, his very flattering statements respecting it were borne out by fact. Being somewhat acquainted with the growth of Indian corn in America, I was naturally interested in the production of ten acres of this valuable plant in this country, particularly as it had often engaged my private speculations, whether it could be raised in England with success, and having often wished to make the experiment myself. On my visit to Mr. C.'s farm I was accompanied by a gentleman, who, from a long residence in the United States, is intimately acquainted with the culture of this noble production of nature in its every stage; and I may say that we were both highly gratified at the fine and luxuriant appearance of the crops respectively, but of the dwarf corn in particular. Mr. C. has sown Indian corn of two kinds, in separate situations; the crop upon which he chiefly rests his hopes, and stakes his reputation as an agriculturist, being the ten acres of the dwarf kind, which has grown to the height of between three and four feet, and presents an even and beautiful aspect. Of the other kind, Mr. C. has but a small plantation, but it contains many plants approaching six feet in height, and bearing many ears, but little inferior in size to what they frequently attain under a more congenial climate. Mr. C. does not calculate on the success of this taller sort, although it was recommended to him as an *early* kind, it being his opinion, as expressed in his Register, that not a single ear of it will ripen. It is, however, within possibility that nature may decide differently from Mr. C. in this particular, but if not, an abundance of excellent fodder is provided. Neither my friend nor myself entirely concur with Mr. C. in his cultivation of this valuable grain; but from what we have witnessed at Mr. C.'s farm and in the garden of a gentleman in the neighbourhood of the City Road,* we cannot but conclude that it may be cultivated in this country with advantage to the farmer, and that it would in all probability prove of decidedly

* This gentleman has had many ears weighing upwards of half-a-pound, and from eight to ten inches in length. It is his opinion that Indian corn should be transplanted like cabbage plants from a seed bed, and that unless the soil be very rich the ears will not fill.

superior value to barley and oats, as being far more productive to the acre *in grain*, and as yielding a vast abundance of excellent fodder in addition. The great advantage of Indian corn is, that the whole of the plant may be used as food; the grain being highly nutritious to man, whether ripened into meal for bread, or eaten while green as vegetables; and cattle and hogs are exceedingly fond of the leaves and stalks, whether green or dried. Mr. C. states his expectation of the produce of his Dwarf Corn at 100 bushels to the acre, (that is, of grain when threshed,) notwithstanding that he considers it has been injured by the birds to the extent of 10 bushels per acre. This I cannot but consider as an over-estimate of the produce, and should think, with my friend, that 50 bushels of good sound grain per acre an abundant return under all existing circumstances; the lateness, and small portion of warm weather we have had this summer, included. Should only the latter quantity be realized, the advantage of Indian corn over barley and oats must be apparent, and the more so, as (besides being equally serviceable in rearing all the cattle and live stock on a farm) it makes a wholesome bread for the farmer's table, independently of the extra quantity of fodder and litter yielded by the leaves and stalks.

It appears, as stated by Mr. C., that it is the opinion of Mr. Arthur Young, that Indian Corn would answer well to be cultivated in England, though it were only for the sake of the fodder. There is, however, every reason to believe that in favourable seasons it will ripen sufficiently to be made into bread, and that it will *always*, with due care, arrive at a degree of maturity to become the main staff of life in the farm-yard. The growth of barley and oats is puny and diminutive compared with that of Indian corn. In America, this towering plant constitutes the chief article of subsistence to the small farmer, who with the aid of a cow, a few pigs, and poultry, contrives to live in plenty and contentment. The bread of Indian corn is said by the Americans to be more nutritious and wholesome in their climate than wheaten bread, it being considered less astringent. It is also eaten in its green state, as peas, either boiled or fried, and when baked makes a good domestic substitute for coffee, which when sweetened with their native honey or molasses, forms a very agreeable beverage. An American may be said to value his corn more than the Turk does his coffee, the Hindoo his rice, or the Chinese his tea-plant; and for this reason, that it is more extensively and importantly useful. I would then simply state it as my opinion, in unison with that of my more experienced friend who accompanied me to Barn Elm, and in unison also with the opinion of Mr. Cobbett and Mr. A. Young, as already mentioned, that Indian corn of the dwarf kind, or such as is generally grown in the New England States and in the Canadas, might be grown in England generally, with great advantage to the farmer; at any rate, the cultivation of this luxuriant plant in this country deserves the most persevering efforts to bring it to success, inasmuch as its produce, in equally favourable circumstances, so greatly exceeds that of wheat, barley, or oats. In America, a crop of Indian corn varies from 60 to 90 bushels, 100 bushels to the acre being but *very rarely obtained*.

For the information of those of your agricultural readers who may not be acquainted with the mode of cultivation of Indian corn, I will just add, that the dwarf kind should be planted or sown early in May, in rows about 3 feet apart, and the plants left, at from 12 to 15 inches asunder; the rows being kept well hoed up and cleared of a portion of the suckers or minor shoots. Every plant, whether it have one or two stems, should have this space to grow in. Mr. C.'s corn not having been properly attended to in this respect, is by no means so fine or productive as it probably would otherwise have been. Mr. C. sowed the seed in rows, at the rate of something less than a gallon to the acre, and the plants having been left too close in the rows, the consequence has been a diminished growth. The quantity of small shoots from the root which have been left to impoverish the plants, in addition to the closeness of the plants in the rows, evidently indicates considerable negligence in the cultivation. But Mr. C. observes, that he was for a considerable time nearly in despair of the success of his crop, owing to the unfavourableness of the weather, which may account for its not having received a more careful cultivation. All kinds of this plant demand a good rich soil; a light loam approaching to sand is the most congenial. When the leaves have attained their full growth, and just before they are beginning to decay, they should be stripped off, and the tops of the plant also taken off. The leaves should be laid out in rows to dry, and then gathered and bound up in small bundles, which will be found as fragrant as the finest meadow hay. By this process the ear of the corn is supposed to derive an increased quantity of nourishment from the stem, and is left to ripen till the latter end of October. In harvesting the ears, they are merely cut or broken off the stems, these being left for a subsequent gathering. When the corn is housed, the husks must be stripped off the ears previously to threshing, and should the flail be found not to clear the cobs, (that is, the inner pith or substance in which the grain is imbedded,) sufficiently, the portion of the grain that still adheres to it must be rubbed off with the hand; the American farmers shelling their corn almost entirely by hand. There is however, a modern machine of simple construction, which is getting into use,* and with which I have shelled a considerable quantity, which executes this business with astonishing precision and despatch.

The American farmers usually plant their Indian corn at a distance of 4 feet each way; putting 4 or 5 grains in a spot a few inches asunder, and after they have attained the growth of a few inches above the ground, they hoe out one or two of them so as not to leave more than three good plants standing, which gradually spread around and fill up the spaces. They are very attentive to keeping the ground clean, by repeated ploughing between the rows.

Should the foregoing particulars relative to the nature and growth of Indian Corn be considered worthy insertion in your widely circulating Register their adoption into its pages would greatly oblige Sir, yours, very truly, WM. HERBERT.

* This machine is fully described in Register of Arts, N.S. vol. ii. p. 221.

On the presumption that Mr. Cobbett's experiment is successful, and that his example were to be followed throughout these kingdoms with equal success, it is curious to observe how very soon sufficient seed might be obtained for the purpose, from the produce of the field at Barn Elm *alone*. Our correspondent, Mr. W. Hebert, estimates the probable produce of Mr. Cobbett's ten acres at 50 bushels the acre, and he was informed that about a gallon of seed was used per acre; consequently, 10 acres yield 500 bushels, which, multiplied by 8, gives 4000 gallons, or sufficient seed for 4000 acres in 1829, which is an increase of 1 to 400: but as Mr. Cobbett reckons upon 100 bushels to the acre, or an increase of 1 to 800, the respective calculations will stand thus for the three succeeding years.—

Upon Mr. W. Hebert's Datum.		Upon Mr. Cobbett's Datum.	
1829—seed for	4000 acres, 400 increase	1829—seed for	8000 acres, 800 increase
1830—seed for	1,600,000 acres, 400 increase	1830—seed for	6,400,000 acres, 800 increase
1831—seed for	640,000,000 acres,	1831—seed for	5,120,000,000 acres.

The united kingdom of Great Britain and Ireland contains 74 millions of acres, of which at least 64 millions of acres are considered as capable of cultivation. Half an acre with ordinary cultivation is sufficient to supply an individual with corn, and one acre is sufficient to maintain a horse; consequently, the United Kingdom contains land enough for the sustenance of 120 millions of people, and 4 millions of horses.—The application of these facts it is not our province to discuss.—EDITOR.

In addition to the foregoing, we have received the following queries, which we readily insert, on account of the importance of the subject.

Can good bread (that is, what an Englishman would call "good bread") be made from Indian corn meal alone, if finely ground, and dressed in the best manner?

Can such bread be made by any admixture of Indian corn meal with wheat flour; if so, what are the requisite proportions?

"AN HISTORICAL ACCOUNT OF SUB-WAYS IN THE BRITISH METROPOLIS,

For the Flow of pure Water and Gas into the Houses of the Inhabitants without disturbing the Pavements; including the Projects in 1824 *and* 1825.—By JOHN WILLIAMS, Patentee, Cornhill, London. Published by Carpenter and Son, Bond Street, 1828."

[*Continued from page* 331.]

To shew that the circumstance of government having declined to sanction the construction of sub-ways by their immediate patronage and support, is no proof that the plan is impracticable, and that his

not having been hitherto able to induce the opulent citizens to advance capital to form a joint stock company, for carrying the scheme into operation, is no evidence that the speculation would have turned out unprofitable; he instances many curious particulars respecting the introduction and progress of the present method of lighting streets and houses by the carburetted hydrogen gas; which when first proposed, was objected to by public institutions as a visionary, impracticable scheme; by the capitalists as a wild, unprofitable one; and by people generally, as a dangerous and explosive one: yet the introduction of gas-lighting, though thus ridiculed, objected to, and dreaded, is now universally admitted to be one of the most important improvements; and the only fear now is, that the profits of the individuals through whose means the improvement has been effected, should be too great, and that they should receive more than a fair remunerating return for the capital they have embarked in the undertaking.

With a view to throw still more light on these matters, the author not only gives the discussion which took place between the chartered coal gas company, and a contemplated oil gas company, but descends into the origin, and details the progress of the common sewers, the methods of supplying London with water, the disputes with the different water companies, the various acts of parliament bearing on these subjects, as well as the paving acts, with all the tedious technicalities of legal phraseology, probably with a view of shewing that he derives his information from authentic documents.

Nor do the various schemes for which joint stock companies were formed in 1825, escape the notice of Mr. Williams, who to shew that his scheme, though good, was lost among the multiplicity of bad ones, gives complete lists of them in a tabular form, with the number of shares, the amount of proposed capital, and the money actually paid in each; from which it would appear, that 243 schemes which have been acted upon, required a capital of £243,000,000; of which about £43,062,808 had been actually paid, leaving a balance of nearly £200,000,000, and that it would have required no less than £350,000,000, to carry into effect all the meditated projects of the late bubble mania.

The supply of water to the metropolis occupies much of the author's attention; he touches upon the quantity, quality, and rate at which that important commodity is at present attainable, and proposes a remedy for the impurity of the water which is supplied by the different companies from the river Thames; or he rather supports the views of a writer who proposed some time ago in a communication to the Times newspaper, and suggests some additions to the plan in the following terms: "The London cloaca, (great common sewer), might be carried beyond Tilbury to the Nore to empty itself; and the sub-ways continued a mile beyond, or branch off in another direction to the pure waters of the sea, from which marine water might be brought through the tubes of the sub-ways into the metropolis, and the intermediate places through which they are built."

The following extract from a paper addressed by Mr. Francis, of

Regent Street, to the Commissioners appointed to inquire into the supply of water to the inhabitants of London may prove interesting as bearing upon this point. Mr. Williams publishes the document at length, with an estimate of the expense of carrying the plan into effect.

"The plan whereby I propose to supply the inhabitants with *pure spring water* is, to cause each water company to excavate a spring water tank near enough, when their present engines are erected by the Thames side, so as to be within reach of them; as then no alteration in the main pipes would be required, and the advantages of supplying the engines with fuel by water-carriage be continued."

To prove the practicability of this plan, it is stated that some years ago a supply of pure water was obtained near Sheerness, in a situation least likely by appearance to create such an effect as was produced, it being a swampy peninsula that projected into the sea. "A well of large dimensions was sunk about 100 yards from the sea shore, to a great depth, that produced a supply of the purest water, and which rose when the spring was obtained, about 150 feet from the bottom in less than 30 minutes, overflowing the top of the well for several days; it then subsided a few yards and ever since it has continued inexhaustible."

But, led away by our author's example, we are wandering from the main subject, that of sub-ways, and therefore shall close this article with a very few additional remarks on this production before us, which contains, as we have before stated, a large quantity of very valuable matter; but the arrangement of the work is susceptible of considerable improvement: for the bearing of the quotations on the points under consideration are not so apparent as they might be made by a more systematic arrangement of the materials. Nor is our author quite correct in all his inferences, when he maintains that water conveyed through a pipe deposited in a tunnel would be purer from being less mixed with earth than when covered over with earth: and that, from the largeness of the iron pipes, "the body and weight of water bursts the small leaden service pipes," he must have forgotten one of the fundamental laws of hydrostatic pressure; like a great man, who, while recently writing a little book, maintained that the same quantity of fluid would weigh differently in different-shaped vessels.

Before concluding, we would take the liberty of hinting to Mr. Williams, who, every body will admit, has already done much towards the accomplishment of his plans for improving the metropolis, the propriety of introducing his sub-ways into streets, where common sewers are about to be made, instead of beginning with Cornhill, Cheapside, Fleet Street, &c. By this means the plan might be tried at a very trifling expense; the charge for excavating (and we presume that to constitute the principal charge) would then be entirely saved. The practicability and utility of London *Sub-ways* would thus be established, and their general introduction follow as a matter of course.

MISCELLANEOUS INTELLIGENCE.

BRAZILIAN DIAMONDS.—The weight of diamonds found by the government agents in the district of Tajuco, in Brazil, from 1772 to 1818 was 1,298,037 carats; and the quantity received from farming out the mines to a company after the government had ceased to work them on its own account, was 1,700,000 carats, being together equal in value to about £67,000,000 sterling. The largest of the Brazilian diamonds hitherto obtained, weighs 138½ carats. It was found in the year 1771, near the river Abaité, by a poor negro slave, who was liberated, and had a pension of about £50 per annum settled upon him for life.

PHOSPHORESCENCE OF THE SEA.—Bory St. Vincent maintains, that luminous sea water contains no infusory animals, and that the phosphoric light which it frequently exhibits is not a product of vitality.

BLOWING A RIVER OUT.—The Southern Mail failed at Washington on Tuesday last, in consequence of the gale, which was so long and violent, as to blow the waters out of the Potomac to such a degree as to render it unnavigable.—*New York Paper.*

TRAVELLING IN AMERICA.—Such are now the facilities for travelling in America, that a tour of 2000 miles may be performed by steam vessels and other conveyances in the short space of about 16 days, and at an expense of about £14 sterling.

LIST OF NEW PATENTS SEALED.

AIR STOVES.—To G. Stratton, of Hampstead Road, Middlesex, for improvements in warming and ventilating churches, hot houses, &c. Sealed August 28, 1828. To be enrolled in six months.

SHEATHING OF SHIPS.—To G. S. Pattinson, Esq. of Old Burlington Street, for an improved method of applying iron in the sheathing of ships, &c. and of applying iron bolts, nails, and spikes, thereto. 4th September, 1828. Six months.

LOCOMOTIVE CARRIAGES.—To J. and S. Seaward, of the Canal Iron Works, Poplar, for an improved method for propelling carriages on roads, or vessels on water. 4th September, 1828. Six months.

STEEL.—To C. Sanderson, of Park Gate Iron Works, Rotherham, for a new method of making steel. September 4th, 1828. Two months.

SAIL-MAKING.—To Admiral Brooking, of Plymouth, for a new method of making sails of ships, &c. 4th September, 1828. Six months.

CORDAGE.—To John Robertson, of Limehouse Hole, Poplar, for improvements in the manufacture of cordage. 4th September, 1828, Six months.

FILTRATION.—To William Bell, of Lucas Street, Commercial Road, Middlesex, for improvements in filtering water and other liquids. 4th September, 1828. Six months.

WATER COURSES.—To Professor Farish, of Cambridge, for an improved method of clearing out water courses. 4th September, 1828. Six months.

HATS, CAPS, &c.—To T. R. Williams, of Norfolk Street, Strand, for improvements in making hats, caps, bonnets, &c. 11th September, 1828. Six months.

FURNITURE.—To T. Minikew, of Berwick Street, Middlesex, for improvements in chairs, sofas, vehicles, &c. 11th September, 1828. Two months.

BLOWING APPARATUS—To J. B. Neilson, of Glasgow, for an improved application of air to furnaces. 11th September, 1828. Six months.

SCREWS.—To L. W. Wright, of Mansfield Street, Surrey, for improvements in making screws. 18th September, 1828. Six months.

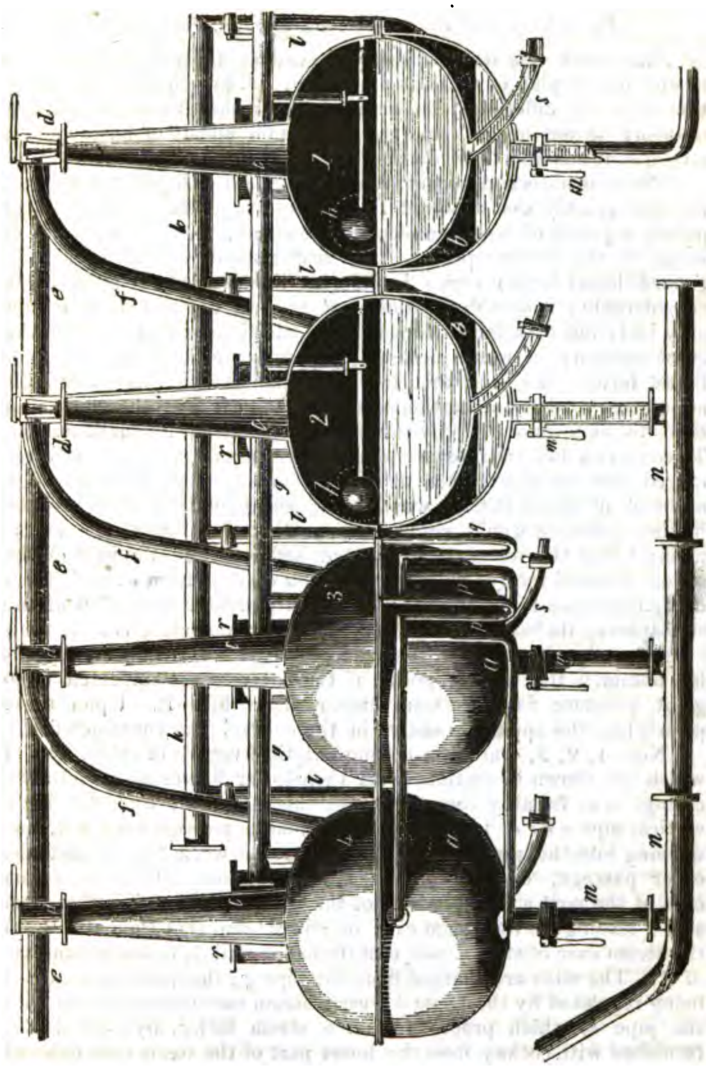
RAILWAYS.—To William Losh, of Benton House, Northampton, for improvements in railroads. 18th September, 1828. Six months.

SPINNING.—To Joseph Rhodes, jun. of Wakefield, for improvements in machinery for spinning. 18th September, 1828. Six months.

CLOTH.—To J. C. Daniell, of Bradford, Wilts. for improvements in machinery for making cloth. 18th September, 1828. Six months.

PROPELLING VESSELS.—To John Melville, Esq. of Upper Harley Street, for improvements in propelling vessels. 18th September, 1828. Six months.

CARTRIDGES.—To E. F. Orson, of Princes Square, Finsbury, for an improved cartridge for sporting purposes. 18th September, 1828. Six months.



STEIN'S PATENT DISTILLING APPARATUS.

PATENT DISTILLING APPARATUS.

By R. Stein, of Regent Street.—*Enrolled, June*, 1828.

Although this still strikingly resembles those constructed in France on the plan of Woolf's apparatus, the principle of its operation is totally different; the object being rather to cause a great economy in the use of fuel, than to obtain spirits of any required strength at a single distillation.

The heat absorbed to convert a given weight of liquid into vapour, exceeds greatly that required to raise its temperature to the boiling point; a pound of water converted into steam, raising six pounds of water to the boiling point. The heat thus developed (generally termed latent heat,) varies in different liquids, but is in all cases considerable; and as distillation is at present conducted, it is not only lost, but occasions a considerable additional expense, from the great quantity of water necessary to condense the vapour into the liquid form. To save this heat, the patentee has contrived his apparatus, so that one portion of a fluid shall cause another portion of fluid to be evaporated, by the heat given out in its condensation. To convert a fluid into steam, not only a certain quantity of heat is required, but also that the heat be of a certain intensity; thus, although a pound of steam at 212° would raise six pounds of water to the boiling point, it would convert no portion of it into steam, as the moment that the water to be heated had acquired the heat of the steam, it could receive no further portion of heat from it. If, however, the steam is formed under a pressure greater than that of the atmosphere, its heat, as indicated by the thermometer, is increased; consequently, it can then continue to impart heat to water, after it has obtained the boiling point, if the latter be not subjected to so great pressure as the steam employed to heat it. Upon these principles, the apparatus shewn in the engraving is constructed.

Nos. 1, 2, 3, 4 are four oblong elliptical vessels or stills, two of which are shown in section, with their lower halves surmounted by casings *a a*, forming thereby steam chambers *b b*; each still has a vertical pipe *c c c c*, terminated by a double passage cock *d d*, one opening into the pipe *e*, which leads to the worm tub, whilst the other passage, opens a communication from one still to the steam case of the next still, by means of the curved pipes *f f f*; that from still 1 leading to the steam case of still 2, and that from still 2, to the steam case of still 3, and that from the still 3, to the steam case of 4. The stills are charged from the pipe *g*, the quantity admitted being regulated by the floats *h*; each steam case communicates with the pipe *k*, which proceeds from a steam boiler, by pipes *l l l l*, furnished with cocks; from the lower part of the steam case descend pipes *m m*; that from still 1 leading to the cistern which furnishes the steam boiler with hot water, whilst the others may either communicate with one common main *n*, leading to a refrigerator, or they may each communicate with a separate refrigerator.

From the upper part of each steam case proceeds a pipe, (shewn at 3 and 4) which communicates with a guage pipe *p p*, and

terminates in a syphon barometer $q\ q$. $r\ r\ r\ r$ are the manholes to each still, $s\ s\ s\ s$ the discharge pipes to the stills, the steam cases being emptied by opening cocks in the pipe $m\ m$, leading to the main n.

The operation is as follows: the stills being charged, and the cocks d being open to e, the steam is admitted into each steam case by the pipes $l\ l$ leading from the steam pipe k, and is rapidly condensed in the steam case, the air escaping by a pipe not shewn in our drawing. When the liquor in the stills has nearly attained the boiling point, the steam is shut off from all the steam cases, but that of N°. 1; and the cocks d are opened to the pipes f, and the main n being cleared of the condensed water, the cocks on m of 2, 3, and 4 are closed. The steam from the boilers (which is of considerable pressure,) continues to flow into the case of N°. 1, and by the heat given out to the liquor in the still, causes it to boil; the vapour passes into the steam case of N°. 2, and the liquor in No. 2, condenses the steam from No. 1, till a common temperature is obtained; the steam from No. 1 being no longer condensed, and having no escape, but continuing to receive heat from the boiler, its temperature increases, when it again gives out its heat to No. 2, causing the liquor in it to boil, the vapour of which passes into the steam case of No. 3, when the same process ensues successively under 3 and 4, and the steam from still 4 passes by the pipe e to the condenser. As soon as the liquid in 2, 3 and 4 begins to boil, the cock on m must be partially opened, to allow the condensed spirit to pass by the pipe n to the refrigerator, yet always retaining a certain portion in the steam case, the height of which may be ascertained by the guage-pipe p, whilst the barometer $q\ q$ will indicate the pressure of the steam in each steam case. The proper pressure will be best obtained by observation, as it will vary in different liquors; during the distillation, the person conducting the process must therefore pay great attention to the barometer, to enable him to do which with facility, the guage-pipes and barometers are all ranged in a cluster at the centre of the apparatus. By this mode of distillation it will be seen that the latent heat of three-fourths of the liquid evaporated is saved, which consequently causes a considerable saving in the article of condensing water. The principal objections to the plan which occur to us, are the great pressure to which the apparatus would be subject, causing considerable danger, and the expense of such a complicated apparatus. We think the object of the patentee has been better obtained in St. Marc's still, which we understand is coming extensively into use, and which has the additional advantage of affording spirit at any given strength at one distillation. We have observed that several large stills of the latter description, have been recently set up in the new distillery of Messrs. Nicholson, in St. John Street. That valuable invention was fully described by us in vol. iv. page 49; but the great success attending its introduction, together with the improved modifications of some of its parts, will require from us a further notice, which we purpose taking at the earliest opportunity.

Fig. 1.

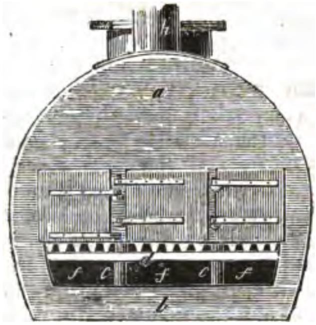


Fig. 2.

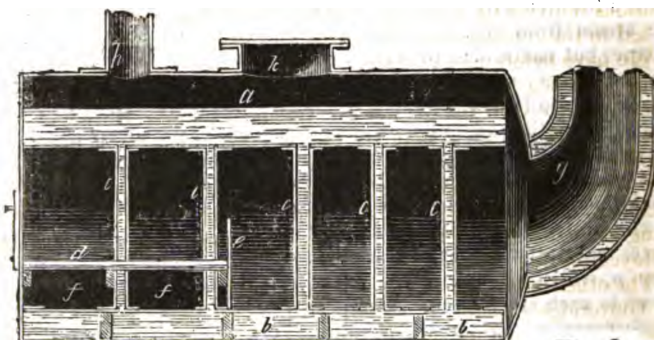


Fig. 3.

PATENT STEAM BOILER.

By Paul Steenstrup, Esq. 8, Basing Lane, London.—*Enrolled June*, 1828.

In the construction of this boiler we do not observe any thing of a very peculiar character; we are not aware that it is intended particularly for steam boats, but the arrangement of its parts seem best adapted to that purpose. It consists of an upper and lower chamber connected together at the sides and by vertical tubes, with the fire place in the centre.

Fig. 1 is an end elevation of the boiler; Fig. 2 a transverse vertical section; Fig. 3 a longitudinal vertical section: the same letters of reference designating similar parts in each. *a* is the upper division or steam chamber; *b* the lower chamber, connected with the upper by the side chambers, and by vertical tubes *c c c*, as shown in the sections: *d* represents the fire bars on which the fuel is laid; *e* the bridge; *f* the ash-pit; *g* the chimney; which is likewise surrounded by water to economize the heat: *h* is the steam pipe; *k* the man hole.

The patentee states that this boiler may be adapted to burn any kind of fuel, *i. e.* either coke, coal, or wood, by merely shifting the

bridge further back, or advancing it to the fore part of the boiler: also that the tubes *c* which pass through between the fire bars, will acquire a higher degree of temperature than those near the chimney, and thereby cause an ascending and descending current, thereby promoting the rapid generation of steam.

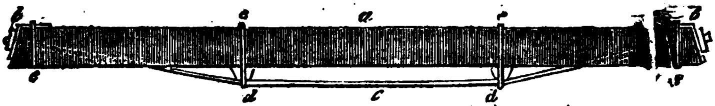
SUSPENSION TRUSSES FOR GIRDERS.

So far back as the month of April last we published a *New Method of Strengthening Girders* on the suspension principle, by Mr. Joseph Conder, of Upper Thames Street; and while we mentioned that Mr. Conder was not ignorant of the application of the same principle in the construction of bridges, we attributed great importance to his meritorious application of it, to the trussing of girders, and commended his liberality in freely giving his invention to the public. Circumstances have turned out as we had anticipated, for Mr. Conder's invention has not only been the cause of several other ingenious individuals publishing similar inventions and plans; but it has led to the introduction of suspension trusses in several instances.

We have before us two letters; the one from Mr. W. Gutteridge, giving a drawing and minute description of a suspension trussed girder, precisely on the plan of Mr. Conder's, described in our 30th number, erected over a span of 44 feet, to support a liquor back, weighing when full 50 tons, at Messrs. I. & W. Nicholson's distillery, in St. John Street, which it does without at all sinking it. Mr. G. concludes his letter with many well-merited encomiums on the arrangements of this distillery, and on Mr. Henry Fox, the engineer employed on this occasion.

The other letter, which came to hand the day after we had received Mr. Gutteridge's letter, is signed N. I., who likewise furnishes us with a drawing and minute description of the truss constructed by Mr. Fox, laying great stress on a model of it having been made "more than six weeks ago;" and at the same time complains of Mr. G. for omitting to notice Mr. Fox's truss in his former communications, and states that he himself had deferred giving an account of it till it had been tried with the full weight.*

A third correspondent has handed to us the following drawing, which represents a plan somewhat simpler, and might therefore be manufactured cheaper than the preceding, while it possesses the same advantages as to strength and durability.



The girder *a* to be trussed is divided longitudinally into two flitches, and between them is introduced a single rod of iron *c*, the

* Quere.—Might not Mr. Gutteridge have delayed noticing it for the same reason?

ends of which pass through kneed plates *b b*, and are then secured by screwed nuts: the ends of the flitches are bevilled off at right angles to the direction of the truss rod. Beneath the girders are placed two triangular blocks *d d*, projecting to a depth proportionate to the strength required. The two flitches are kept apart the thickness of the truss rod, by the introduction of slips of wood between them, and in their places by straps at *e e e e*.

Mr. Conder has himself introduced, with great satisfaction, an improvement on his first plan similar to this, but instead of the two triangular blocks *d d* he uses but one, and places it in the middle of the girder. A model of which was recently introduced by Mr. Millington, in his lecture *on the strength of materials*, at the London Mechanics' Institution.

DESCRIPTION OF "THE NORTH AMERICA" STEAM BOAT.

Abridged from a Letter by PROFESSOR RENWICK, to CAPTAIN EDWARD SABINE, in the Quarterly Journal.

THIS noble vessel navigates the Hudson, between New York and Albany, a distance of about 160 miles, performing the passage regularly within 12 hours, during day-light, which is at the rate of upwards of 14 miles per hour, when the regular stoppages or landings at nine different places on the voyage are taken into the calculation. On one occasion, the passage was made in little more than 10 hours.

The length of this vessel upon deck is 178 feet; breadth of beam 28 feet; depth of hold 9 feet. Her general figure may be compared to the bowl of a table-spoon. The cut-water has a great rake, but in a uniform and regular curve, and all the curves upon the bottom are regular, and without any abrupt angles. The stern-post, to increase the power of the rudder, is vertical; an unusually large mass of dead wood exists towards the stern, while there is but little near the bow.

The North America is impelled by two condensing engines, each of 85 horses. These with the boilers are placed upon a platform, formed by a prolongation of the beams of the deck, until they meet the wheel guards, which are carried in a regular sweep, from the stem to the stern of the vessel. The breadth of the deck, afore and abaft the buildings which inclose the wheels and machinery, is thereby considerably increased, while an uninterrupted passage is left between them from the stem to the stern of the vessel. An advantage similar to the last is gained in the cabins beneath, which, by opening folding doors, may be thrown into one suite from the cabin windows to the bow.

The wheels are 13½ feet in breadth, and 21 feet in diameter. To understand the construction of this wheel, (Professor Renwick says,) you have only to consider the water-wheel as sawn into three parts, one of these to be removed back one-third, and another two-thirds of the distance between the original place of the first paddle, and that which succeeds it. The water-wheel may therefore be considered as

triple; and as each paddle will form a wake litt... those of each separate wheel will strike upon t... relation to the surrounding fluid. The force of th... but one-third of what it is in a continuous paddle, ... so rapid as to oppose almost a constant resistanc... such a wheel, therefore, so far from rendering the ... acts as a fly.

The engines by which this boat is propelled are, in ... respect, identical with those of Watt. The air-pump h... ...ver, more power than usual; it will therefore keep up a vacuu... in the condenser even when the steam has a greater pressure than is usual in engines in ordinary situations. Mr. Robert L. Stevens (the engineer and builder of the boat) is of opinion, that the boilers are sufficient to supply steam of 12 or 14 inches during the entire stroke of the engine, while the air-pump has power to maintain at the same time a vacuum in the condenser. If this be so, the speed may be enhanced, as the wave that is at present raised in front of the boat, is even less than I have noticed in front of others of not more than half the speed. The boiler is of copper. Instead of the parallel motion of Watt, the upper end of the piston rod bears a cross bar, which works between guides formed of iron plates screwed down upon upright posts; these take hold of eccentric pins in wheels upon the axis of the water-wheels; power is lost by the obliquity of the action of these substitutes for the lever, beam, &c. of Watt, but the engine has superior compactness.

PATENT METHOD OF HARDENING PLASTER CASTS AND ALABASTER.

By M. Tissot.

The piece of plaster or alabaster, after being shaped, is put for 24 hours in a furnace. If the piece is only 18 lines thick, 3 hours in the furnace heated up to the temperature required for baking bread is sufficient; if thicker, it is left for a proportionally longer time. At the end of the time, it is withdrawn with caution and cooled, after which it is put for thirty seconds into river water, withdrawn for a few seconds, and then again immersed for a minute or two, according to its thickness. The piece is then exposed to the air, and at the end of three or four days has acquired the hardness and density of marble. It may then be polished.

STEVENS'S PATENT PADDLES.

TO THE EDITOR.

London, October, 13th, 1828.

Sir,—I entreat your acceptance of my sincere thanks, for the favourable and disinterested notices of my patented method of propulsion, which have appeared in your excellent publication, and beg permission to rectify an implied error which occurs in a paper on the subject of my recent experiments, contained in your last number.

It is therein stated that "The impelling surface of the paddle was in both instances nearly equal, but with this difference, that in Mr. S.'s paddle the vertical length was the greatest, whilst the common one was (as usual) greatest in its horizontal length," from which it may be inferred that I had applied as much propelling surface with my paddles as was possessed by those of the common wheels with which they were contrasted; but on reference to my relation of these experiments, recently published, it will be found, that my paddles had not a third part of the surface applied by the wheels, the total area of the former being 7 feet 5¼ inches super, and that of the latter 22 feet 8 inches. The superiority of my paddles, with their comparatively small surface, arises out of their peculiar action, extension of stroke, and application of pressure, at a more advantageous depth in the water,

Allow me to remain, Sir,
Your obliged, humble Servant,
J. L. Stevens.

REGULATING VALVE FOR GAS-WORKS,

By Mr. W. H. Eastwick, of Bath.

The following description of a regulating valve for adjusting the flow of gas into the main, according to the consumption of it, has been introduced into the Bath gas-works, by Mr. Eastwick, the engineer of that establishment, and is the subject of a communication in the last number of the Quarterly Journal of Science, from Mr. R. Addams, to whom Mr. Eastwick's letter is addressed.

Gas-Works, Bath, June 1st, 1828.

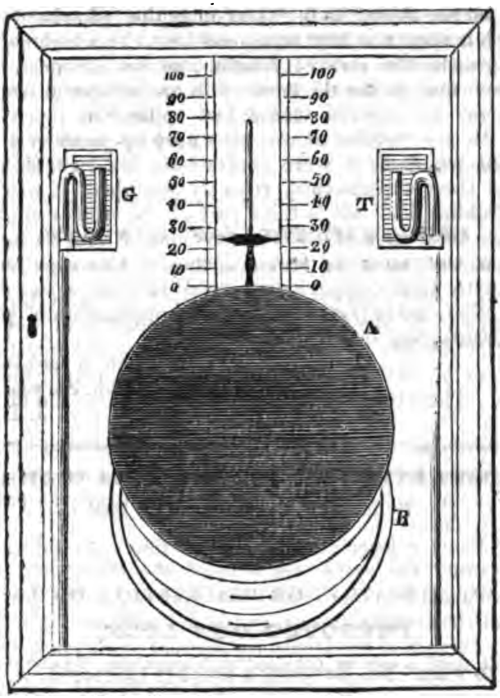
Sir,—Agreeably with your request, I send you a drawing of the index of a regulating valve, which I placed on the eight-inch main pipe leading from these works, last summer, and which I had the pleasure of shewing to you when you were in Bath in January last.

The valve consists of a circular plate of metal, nine inches in diameter, sliding over the mouth of the main pipe, in a chamber: the face of the index is a representation of the valve itself; so made in order that the superintendant may know the precise position of the valve at any time.

The black disc A is a thin plate of metal attached to a rod coming up from the valve behind the index frame, in which there is a slit for the pin which carries the index to pass. The portion of the circle B, which is uncovered by the disc, represents the aperture, or gas-way into the main pipe. G is a pressure guage connected with the main on the gasometer side of the valve, and T another pressure guage, also connected with the main on the town side.

There is a burner supplied from the town side of the valve placed before the eye of the person who adjusts the valve.

From repeated inspection of the town lights at all hours of the night, as well as of the burner before the index, the requisite pressure is known and regulated; as the night advances the valve is lowered



more and more, and in the morning (when the lamps *ought* to be all out) it is depressed to one-tenth of an inch; that being sufficient to cause the exit of the gas in the lowest situations.

The operation of the valve is so well understood, that I have been enabled to leave the management of it to the workmen ever since its erection.

By this simple yet effectual contrivance, the saving of gas has been very great.

I have never had occasion to elevate the valve more than $\frac{25}{100}$ths,* as shewn in the drawing, this being sufficient for the escape of upwards of 7000 cubic feet of gas per hour, without the pressure of the gas being reduced more than $\frac{1}{10}$th of an inch, (viz. from one inch to $_{10}$ths after it has passed the valve.)

I believe you are aware that from the nature of the coal used at this establishment, the retorts, after much use, become lined with a carbonaceous substance, of so considerable a thickness, as to diminish their capacity to one-half and less, on which account a larger number of retorts *was* necessary, and from the imperfect conducting power of this incrustation, the decomposing process was slower, and additionally expensive. I am happy to inform you that I have perfectly

* When the area of the lunaric aperture is=14·783 square inches.—R. A.

succeeded in removing the incrustation in the following way :—The retorts are left open and kept at a good heat, by which the carbonaceous lining undergoes slow combustion, and in the course of a week or more, according to the thickness, it is entirely burnt away.

Believe me to be, Sir,
Very respectfully your's,
W. H. EASTWICK.

To R. Addams, Esq.

IMPROVED TALLOW CANDLES.

Communicated by JOHN MURRAY, Esq. to Brewster's Journal.

THE cotton wicks are previously steeped in lime water, in which there has been dissolved a considerable quantity of the nitrate of potass. The chlorate of potass is preferable to the nitrate, but the great expense of the former salt precludes its employment on the large scale. The wicks should be well dried before the tallow is put to them.

By this process, Mr. Murray states, that the candles afford a purer flame and more brilliant light; the combustion of the wick is so complete, as to render the snuffing of them nearly as superfluous; and that they do not *run* or gutter.

SPECIFICATION OR DESCRIPTION OF AN IMPROVED GUN LOCK,

For which a Patent has been obtained by NATHANIEL SALTONSTALL, Jun., of New London, Conn., prefaced by a few remarks on the defects of those now in use. *Issued May*, 1828.

VERY many of the dangers to which we are exposed from the accidental discharge of fire-arms, arises from the present imperfect construction of the lock, the trigger of which, is at all times immediately connected with the dog, and may, in many cases, be made to trip when only half-cocked, and has been attended with the most fatal consequences to sportsmen, horses, horsemen, soldiers, and private individuals, by the accidental catching of the trigger, the sudden jar of a holster, the pressure of a heavy finger, or the trifling of the inexperienced, when little care was supposed necessary; and with most of our locks the dog must be drawn from the tumbler so suddenly, to prevent their catching at half-cock, as to destroy the aim.

The following description of my improvement, I think, will supply these defects, and combine entire safety with durability and simplicity. When the lock is only half-cocked, the tumbler is secured by a strong steel dog, hung nearly perpendicular from the top of the plate, its screw supported on top by a bridle or cap; on the right hand side of this dog, and falling nearly perpendicular with its centre, is a tooth or wedge, with its point downwards; on a line with the bottom of this tooth or wedge is a lever, which has on the end next the tumbler a tooth or wedge, similar to the one on dog, and an arm projecting on its outside at right angles with the plate; this lever

may be of a suitable length, accommodating itself to the size of the lock, and is secured by a screw on its opposite end; between this lever and dog, and operating near the heels of each, lays a double acting spring, forcing the dog into the tumbler, and the lever from the dog; the lever is prevented from falling below the plate by a projection or stop. If the lever is now raised by the trigger, the tooth or wedge passes on the right hand side of the one on dog, and by the combined action of the teeth or wedges, and spring, which is now put in its greatest tension, the lock is more firmly secured together; if the lever is kept raised by the trigger the tumbler is secured, and the cock cannot be moved backward or forward by any external application; the moment the finger releases the trigger the lever returns to its place, and admits of cocking the lock. The upper part of the tumbler is more full than the lower, and the upper notch not so deep as the lower one, consequently, when cocked, the tooth or wedge on dog passes on the right hand side of the corresponding one on lever; if the lever is now raised, its tooth or wedge passes on the left hand side of the corresponding one on dog, and draws it from the tumbler without the possibility of its catching at half-cock, unless eased to its place by the hand. As this description refers to a right-hand lock, an inversion of its parts would form one for a left-hand barrel. This improvement is not understood to be confined to the situation I have given it in my drawing, but may be applied in various situations round the tumbler, and at convenient distances, and in forms and sizes suiting the fancy; and its effects produced with equal certainty by dropping the lever, if thought more desirable, which may be accomplished by a different disposition of its parts. With this improvement which is easily applied to old locks by a slight alteration of their tumblers, and removing their dogs and feather springs, or dog springs, and is alike applicable to all gun locks operating by flint and steel, or percussion, effectually securing them from springing when only half-cocked, and insuring a perfect stroke with the cock when firing, is designed without bruising the dog or tumbler notches.

I claim every mode of operation for engaging and disengaging the trigger from the dog, securing the dog with, and disengaging it from the tumbler, on the principle of inverse application of lever or levers, inclined plane or inclined planes, cone or cones; half circle, or half circles; tooth or teeth, of any curvature; applied by an arm or lever, as in my drawing, or on the principles of a bolt, or slide, which produces the same results, and may be varied to suit the fancy.

Franklin Journal. NATHANIEL SALTONSTALL, JUN.

SCIENTIFIC INSTITUTIONS.

LONDON MECHANICS' INSTITUTION.—At the conclusion of PROFESSOR MILLINGTON'S Lecture *on the Construction and Strength of the Teeth of Wheels,* last Wednesday evening, it was announced to the Members by the President, that DR. GORDON SMITH would con-

clude his course *on Poisons* next Friday, and that on the Friday following MR. BRAYLEY would commence a short course on *Meteorites*, or the masses of iron and stone which are observed to fall from meteors traversing the atmosphere.

MISCELLANEOUS INTELLIGENCE.

SIGNOR LIBRI'S OBSERVATIONS ON THE DAVY SAFETY-LAMP.—This philosopher is not of the same opinion as the inventor, that the security afforded to the miner by this lamp is ascribable to the conducting power of the metallic gauze, reducing the temperature of the flame so much as to prevent the ignition of the inflammable mixture around it; but that the effect is caused by the *repellent* power of the metallic wire upon flame. Signor Libri observed that when a single rod was made to approach a flame, the latter was inflected on all sides, as if repelled by the former; and the same effect was produced whether the conducting power of the rod was great or little: also, that the inflection or repulsion was directly as the mass, and inversely as the distance from the flame. Neither were their effects at all diminished by increasing the temperature of the rod so highly, as almost to prevent the possibility of the latter abstracting any of the heat. When two flames are made to approach each other, a mutual repulsion takes place, notwithstanding the temperature of each is increased thereby. From these facts Signor Libri deduces the following theory.—

As a metallic wire exerts a constant repulsion upon flame, it follows that when two wires are placed parallelly so near each other, as not to exceed the radius of twice the sphere of repulsion, the flame will not insinuate itself between them, unless impelled by a force superior to that of the repulsion. If, then, these wires be crossed by others, a tissue will be formed impenetrable to flame, especially when the conducting power of the metal adds its influence to that of the repulsion. From these considerations Signor Libri is of opinion that the number of wires may be greatly reduced, affording the same security as at present, but a greater quantity of light.—*Bibliotheque Universelle.*

[We do not know how to reconcile the latter observations respecting the size and distance of the wires, with the published experiments of Sir H. Davy, who determined that there should not be less than 625 apertures to the square inch. We wish that Signor Libri had been as precise in this respect.]—*Ed. Register.*

STAMMERING.—A letter from Mr. James Wright, of Bolton Row, Chelsea, has appeared in the last number of the New Monthly Magazine, in which he recommends a course of treatment for the cure of this unpleasant defect of speech, which he has successfully tried upon several pupils. He says that persons so affected should first practice reading and reciting in a *whisper*, instead of a loud voice, and we are satisfied from our own experience and observation, that his proposition is a correct one.

He observes, that all stuttering is occasioned by an insufficient application of the organs of articulation; that the efforts of the stutterer are accompanied by more or less distortion of countenance, and peculiar starts or motions of the body; which irregularities are prevented by the removal of the impediment of speech. Mr. Wright therefore recommends that the stutterer should repeat his lessons or exercises *before a looking glass, first in a subdued whisper, then in a louder whisper, afterwards gradually increasing the voice* until the organs of articulation are softly and imperceptibly brought into action.

Lancellotti's Mixture for Silvering Mirrors.—Dissolve three parts of lead with two of mercury; this mixture being cleared of the coat of oxide on its surface, is to be poured upon the glass, which has been previously well polished, and heated to about the same temperature as the amalgam. This alloy is said to adhere to the glass with great firmness, and to cast a very pure reflection.

Sting of a Wasp.—The bulb of an onion, or garlic, cut and applied immediately to the place stung, instantly removes the pain.—*Recueil Industrielle.*

Petrifying Quality of the Irawaddy.—"I formerly noticed the petrifying qualities of the water of the river Irawaddy; I now saw a strong proof of the rapidity with which it converts foreign bodies into stone. The pioneers were ordered to remove a house, which would have interfered with the defence of a stockade if the enemy had assailed it. Upon endeavouring to cut down the massive teak pillars on which it was raised, they found that the edges of their hatchets were all turned. On examining into the cause of this, they found that the pillars were petrified throughout, though the house had only been built ten years; and the pillars were under water three months in the year during the monsoon."—*Alexander's Travels in Persia.*

Human Activity.—"A man trained to violent exercise from his childhood is said to be capable of distancing the fleetest horses, and of continuing his course when they give up in weariness and exhaustion. His muscular power is immense, as we see daily proved by the weights raised with ease by common porters. However, the exertions of our ablest pedestrians give but a faint idea of the full powers of a practised runner. The couriers of Persia used regularly to traverse 30 leagues in the space of 14 hours; and some natives of Africa are reported able to outstrip the lion. The savages of North America pursue the swiftest stags with such rapidity as to weary and overtake them. They have been known to travel over the most rugged and pathless mountains, a distance of 11 or 12 hundred leagues in six weeks or two months."—*London Weekly Review.*

German Method of procuring Flowers in Winter.—A branch, proportioned to the size of the object required, is sawn off the tree, the flowers of which are to be produced, and is plunged into a spring, if one can can be found, where it is left for an hour or two,

to give time for such ice as may adhere to the bark to melt, and to soften the buds; it is then carried in a chamber heated by a stove, and placed in a wooden vessel containing water; quick-lime is to be added to the water, and left for twelve hours. The branch is then to be removed into another vessel, containing fresh water, with a small quantity of vitriol to prevent its becoming putrid. In a few hours the flowers will begin to appear, and afterwards the leaves. If more quick lime be used, the flowers will appear quicker; if, on the contrary none be used, the plant will vegetate more slowly, and the leaves will precede the flower.—*Medical Surgical Journal.*

Cornish Mines.—The names by which the Cornish mines are distinguished, are usually invented by the first adventurers, and are often whimsical enough; the usual prefix, huel (always pronounced, and generally erroneously spelt, wheel,) signifies in the Cornish language, *a hole;* while the specific name of the mine is taken from some trivial or accidental circumstance:—thus, Dolcoath was the name of an old woman, Dorothy Koath, who lived upon the spot where the working of the mine commenced; Huel Providence was so called from the accidental way in which it was discovered; and Huel Boys from the lode having been first noticed by children, who had been playing and digging pits in imitation of shafts. By a rough calculation it may be stated, that there are about 130 mines in the country; but the number is of course subject to variation; old workings being frequently given up, and new mines opened, or forsaken ones resumed.

The Cornish Method of Smelting Tin Ore—consists, in first heating the ore, with about an eighth part of culm, in a reverberatory furnace for six hours, during which period the sulphur and arsenic are volatilized, and the ore is reduced to its metallic state; the furnace is then tapped, and the liquid metal runs out: a second melting, however, is necessary, before it is sufficiently pure to be cast into blocks, and assayed at the coinage. After this last melting, and before the tin is poured into the moulds, a piece of green apple-tree wood is thrown into the liquid metal, and kept under its surface, the effect of which is to throw up the scoria with rapidity; it would seem to act merely in producing a violent ebullition, by the sudden disengagement of steam. One hundred parts of the oxide of tin (black tin), at an average, will yield about sixty-five parts of metal, or white tin, as it is technically termed.—*Guide to Mount's Bay.*

Cornish Copper.—This metal is comparatively of modern discovery in Cornwall, and has not been worked longer than a century, although it is now the greatest metallic product of the country. The reason assigned for its having so long remained concealed, is the assumed fact, that copper generally occurs at a much greater depth than tin, and that, consequently, the ancients, for want of proper machinery to drain off the water, were compelled to relinquish the metallic vein before they reached the copper. It is stated by Pryce, in his Mineralogia Cornubiensis, as a general rule, that tin seldom continued rich and worth working lower than fifty fathoms; but of

late years, the richest tin mines in Cornwall have been much deeper. Trevenen mine was 150; Hewas Downs 140; Poldice 120; and Huel Vor is now upwards of 130 fathoms in depth. Upon the first discovery of copper ore, the miner, to whom its nature was entirely unknown, gave it the name of *poder;* and it will hardly be credited in these times, when it is stated that he regarded it not only as useless, but upon its appearance was actually induced to abandon the mine; the common expression upon such an occasion was, 'that the ore came in and spoilt the tin.' About the year 1735 Mr. Coster, a mineralogist of Bristol, observed this said poder among the heaps of rubbish; and seeing that the miners were wholly unacquainted with its value, he formed the design of converting it to his own advantage; he accordingly entered into a contract to purchase as much of it as could be supplied. The scheme succeeded, and Coster long continued to profit by Cornish ignorance. Besides tin and copper, some of the Cornish mines yield lead, cobalt, and silver. The ores are in veins, which are provincially termed lodes, the most important of which run in an east and west direction: during their course they vary considerably in width,—from that of a barley-corn to thirty-six feet; the average may be stated at from one to four feet.—*Ibid.*

Old Manner of Naming People in Norway.—If a man's Christian name be Robert, for example, all his family in the first generation become Robertsons; and if his eldest boy be baptized John, he is of course John Robertson; and the girls in like manner, *pro hac vice,* are all Robertsons: when the son grows up and has children, they will all be Johnsons, boys and girls as before; and so on, changing the family name every generation. If there happen to be three sons in a house, named, we shall say, Henrich, Frederick, and William, these will branch off three separate patronymies from the three brothers, and their children will be respectively, Henrichsons, Fredericksons, and Williamsons.

Revenue from Beer and Gin.—The amount of duty upon strong beer brewed in England and Scotland, in 1827, was £6,172,239. The numbers of quarters of barley malt upon which duty was paid in the year 1827, in England, Scotland, and Ireland, was £3,483,793. The total number of gallons of proof spirits distilled in the United Kingdom in 1827, was 19,684,428; and the amount of duty paid was £4,178,535.

Culture of Aquatic Plants in China.—The Chinese take advantage of their lakes, pools, and rivulets, by cultivating different aquatic plants in them, many of which are considered as food. The government has planted these vegetables in the lakes, marshes, and uncultivated watery grounds belonging to the state, and the emperor has introduced them into all the canals of his gardens. These and other aquatic vegetables may generally be introduced into Europe, for they are not so sensible of changes in climate as those which grow in the earth.—*Bull Univ.*

LIST OF EXPIRED PATENTS.

Continued from page 302.

FIRE-ARMS.—To Thomas Sykes, of Sheffield, York, for improvements in the construction of guns, pistols, &c.—Dated August 4, 1814.

WOOL-COMBING.—To James Collier, of Upper Thornhaugh Street, Middlesex, for a machine for combing wool, and other fibrous substances.—Dated August 4, 1814.

NAVIGATION.—To James Thompson, of Yarmouth, for a method of assisting to render a ship governable in all her motions.—Dated August 4, 1814.

FILTRATION.—To Edward C. Howard, of Nottingham Place, Mary-le-bone, for certain means of separating insoluble substances from fluids in which they are suspended.—Dated August 4, 1814.

HYDRAULICS.—To Tobias Mitchell, of Upper Thames Street, for a machine for raising water for the impelling of machinery.—Dated August 4, 1814.

FIRE-ARMS.—To John S. Pauly, of Little Charlotte Street, Hanover Square, for improvements in the construction and use of fire-arms.—Dated August 4, 1814.

SILK THREAD.—To George Cortould, of Braintree, Essex, for a spindle for the manufacture of silk thread.—Dated August 4, 1814.

MUSIC.—To Sebastian Erard, of Great Marlborough Street, for improvements in musical instruments.—Dated August 4, 1814.

WINDLASSES.—To Michael Larkin, of Blackwall, for improvements in ships' windlasses.—Dated August 16, 1814.

WALKING-STICKS.—To Henry W. Vanderkleft, of Holborn, for a walking-staff to contain fire-arms, writing and drawing instruments, &c.—Dated August 17, 1814.

HAY-MAKING.—To Robert Salmon, of Woburn, Bedfordshire, for improvements in machines for making hay.—Dated August 22, 1814.

PAPER-MAKING.—To John and George Dickenson, of Nash Mills, Hertford, for improvements in the said John Dickenson's machinery for making paper.—Dated August 24, 1814.

PILL-BOXES.—To James Penny, of Low Nibthwaite, Colton, Lancashire, for an improved method of making pill-boxes, &c.—Dated September 8, 1814.

WINNOWING.—To William Lister, of Paddington, for a machine for separating corn or seeds from straw and chaff. Dated September 17, 1814.

WEAVING.—To J. and P. Taylor, of Manchester, for improvements in a loom for weaving any fibrous matters.—Dated September 21, 1814.

COPPER.—To W. E. Sheffield, of the Polygon, Somers Town, for improvements in the working of copper, and other metals.—Dated September 21, 1814.

AGRICULTURE.—To James Dobbs, of Birmingham, for improvements in machines for gathering in grain, and other produce.—Dated September 21, 1814.

TO OUR READERS AND CORRESPONDENTS.

We have received a letter from Mr. Knowles, pointing out an error into which we have been led by a correspondent, in a short notice we gave of Sir Robert Seppings's patent for an improved construction of made masts, published in our 15th number, N. S. Mr. Knowles states that this mast is made as solid, as good workmanship in affixing the parts, and the power of many screw hoops, can make it. That it is without any keys or mortices, and that "the chief merit of the invention, consists in making masts by a new combination of materials far less expensive, and of more durable wood, than has hitherto been employed for this purpose, and in such moderate lengths that the parts can easily be transported from place to place, and be expeditiously removed if the masts require to be repaired."

It will be seen by this, that the patent mast in question, is very different from the hollow mast invented by Mr. Smart.

As our only object is to furnish correct information on scientific and useful subjects, we feel obliged to Mr. Knowles for setting us right in this matter, and shall have pleasure in giving place to Sir Robert's specification, if he or his friend, will furnish us with a copy.

Mr. W. Gutteridge, and N. I. will perceive that our notice of their communications at page 357, precludes the necessity of their insertion.

We have received several letters of inquiry respecting Mr. Perkins's Patent Domestic Gas Apparatus, and Gas Purifying Apparatus. As respect the former, we can furnish no more particulars than those given by us in our description of the invention in our recent 42nd number; the Purifying Apparatus is in preparation for our next number.

The letters of W. W.—A.—and Mr. W—n, are under consideration.

Our next Number will conclude the present Volume, and be accompanied, as usual, with Index, Title-page, &c.

Fig. 2.

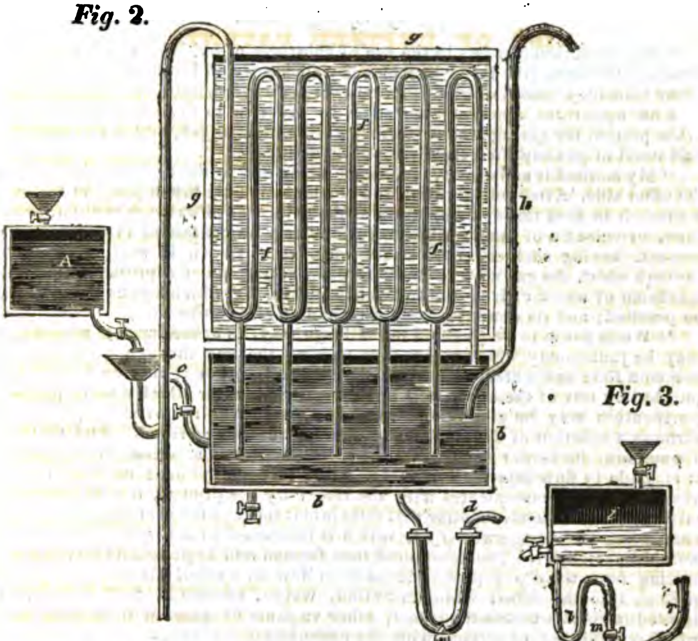
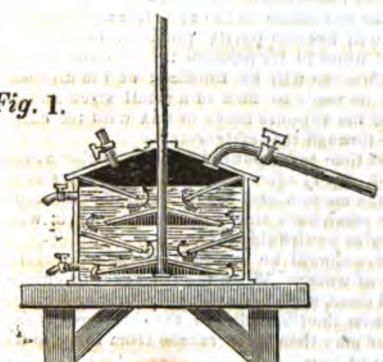


Fig. 3.

Fig. 1.



PATENT PROCESS OF PURIFYING CARBURETTED HYDROGEN GAS, FOR ILLUMINATION,

By HENRY PINKUS, Esq. of 162, Regent Street.—*Enrolled May*, 1828.

IN our description of this gentleman's patented apparatus for the preparation of illuminative gas, in our 42nd number, we stated that he had a distinct patent for its purification, the specification of which, together with the illustrative drawings, we have now the pleasure to lay before our readers.

Copy of Specification.

"My invention consists in the use of chloruret of oxide of sodium, and the chloruret of lime, (the latter of which is well known in England by the names of the chloride of lime, or bleaching powder, or oxymuriate of lime,) combined with an apparatus applying the same to practice in private houses and in other places, for giving a more perfect purification to gas, and destroying the bad smell of gas supplied from the public mains.

"My method is as follows, (reference being had to the figures exhibited on the other side. After refrigeration and condensation has taken place in the gas, I cause it to pass through a solution of the chloruret of oxide of sodium, or of lime, or chloride of lime; which solutions may be contained in one or more vessels, having shelves in the usual way, or as shown in section in fig. 1, through which the gas may be made to pass, acting under a pressure equal to a column of water of from ten to twenty inches, by which means the gas will be purified, and its obnoxious odour or bad smell removed.

"When gas is to be purified in the large way, as at the large gas works, it may be judiciously effected by first passing the gas through a solution of common lime and water, as is now usually practised, or it may be first partly purified by any of the other well known methods, after which a more perfect purification may be given, and its obnoxious odour removed by passing it through a solution of the chloride of lime as before described. And further, I pour into the feeder A, fig. 2, the before-mentioned solution, from whence it is made to flow into the tar vessel *b b b*, through the bent tube *c*. In this vessel, which communicates with the retort by the pipe *d*, the solution will mix with the condensed matter that falls into it through the branch pipes *e e e e e*, connecting the refrigerator *f f f*, which is immersed in a vessel of water *g g*, with the tar vessel. The compound thus formed and kept agitated by the gas issuing from the dip pipe *h h*, is made to flow in a small stream through the pipe *d*, into the retort while in action, where, coming in contact with the ignited materials within the retort, other vapours or gases will be generated, which combining or mixing with the carburetted hydrogen gas, a chemical action will take place, whereby the gas while in the retort, and during its passage through the refrigerator, will become partly purified, or will be so rendered as to be more easily acted upon in its passage through the solution of chloride of lime, when its purification will be finished; or the aforesaid compound from the tar vessel may be made to flow in a small stream into a separate retort while in action, and the vapours made to mix with the carburetted hydrogen gas, in its passage through the refrigerator.

"The solution of the chloride of lime to be poured into the feeder A, may be taken from the purifying vessel, fig. 1, after the gas has passed through and it has become saturated with the ammoniacal liquor, and the chloride of lime may be applied in a dry or semi-fluid state, in the manner in which common lime has been used in a dry or semi-fluid state.

"In preparing the solution there should be one part of the chloruret or chloride, to about thirty-five parts of water. When the chloruret or chloride is prepared in its most concentrated state, a diluted acid, sulphuric or muriatic, may be added to the solution, to assist the liberation of the chlorine gas from the lime, and the quantity of water may then be increased from forty to fifty parts, with one part of the chloride of lime.

"Fig. 3 represents a section of the other form of purifying apparatus, designed for private houses, to render a more perfect purification of the gas supplied from the public mains, and to destroy its obnoxious odour before it is admitted to the burners.

"*i* is a recipient, intended to contain and supply the purifying liquid; this vessel is connected with another vessel *k*, by a syphon, or by a bent tube *l*, inserted through the centre and top of the lower vessel *k*, and having a stop cock *m*. The lower vessel *k* is made gas tight, and formed of tin, copper, or sheet-iron, and is a receptacle for gas, which flows through it, and for the purifying liquid that falls from the upper vessel *i*. *n* is a common sponge placed on a shelf of coarse wire gauze *o*; *p* is a man-hole, made in the side of the vessel *k*, sufficiently large to admit the hand and sponge; *q* is a pipe leading

the gas from the main; and *r* is another pipe to supply the gas in a purified state to the burners; *s* is a waste pipe to let off the liquid when it has become too much impregnated with the impurities of the gas; and *t* is a washing pipe leading from a cistern, *u* and *v* are stop cocks for admitting and drawing off the liquid.

"The operation of this apparatus, fig. 3, is as follows: into the recipient *i* pour a mixture of one measure of the concentrated liquor of the chloride of lime, diluted with twenty-five or thirty measures of water, or pour in the clear liquor from the solution of the chloride of lime. When gas is required to supply the burners, turn on at the same time the stop cocks *m*, in the bent tube *l*, and the leading pipe *q*; the purifying liquid will then flow through the bent tube *l*, on to the sponge *n*, which will absorb a portion sufficient to keep it always wet, and will permit the liquid to filter through and fall to the bottom of the vessel *k*, at the same time the gas will continue rising through the moistened sponge *n*, where it will be acted upon by the purifying liquid, and its obnoxious odour will be removed before it arrives at the burners through the supply pipe *r*.

"The object I have in view in causing the gas to rise through a sponge or other porous substance, is in order to supply the gas to the burners without too much agitation, this being indispensable, in order to afford steady lights, and prevent their dancing or moving up and down, a circumstance consequent on passing the gas through the body of a solution, which would agitate the gas so much as to either wholly extinguish the lights, or to render them too unsteady for use.

"The tube *l* should be bent, as shown, so as always to contain a column of liquid sufficient to prevent the gas from rising into the recipient *i*. When the purifying liquid has filtered through the sponge *n* it may be drawn off from the vessel *k*, and poured into the recipient *i*, to be used over again, until it becomes too much impregnated with the impurities of the gas, when the liquor should be allowed to run off at the waste pipe *s*, and fresh liquor substituted.

"The proper size of a purifying apparatus for a private house will necessarily depend upon the number of lights used. For eight or ten burners the capacity of the recipient *i* should be about three gallons, the lower vessel *k* three feet in length and six inches in diameter. The size of the bent tube *l*, or its lower aperture, should be so regulated as to cause the necessary supply of the liquid to filter through the sponge during the whole time the lights are burning, and should be shut off when they are extinguished.

"I claim to be the original inventor of the combination above described, for purifying carburetted hydrogen gas for illumination, with acid in conjunction with the chloruret of oxide of sodium, or the chloride of lime, by means whereof the gas becomes purified in a greater degree than heretofore, is cleared of obnoxious vapours, and is better for the purposes of illumination. And I claim to be the inventor of the apparatus shewn and described in fig. 3; but I disclaim being the inventor of operating on gas by the ammoniacal liquor, except when in combination with the solution of the chloride of lime; and the manner of using it when so combined.

"And I further disclaim being the inventor of any of the things which it has been necessary for me to mention and describe, which are not included in the above claim made by me. In witness whereof, &c."

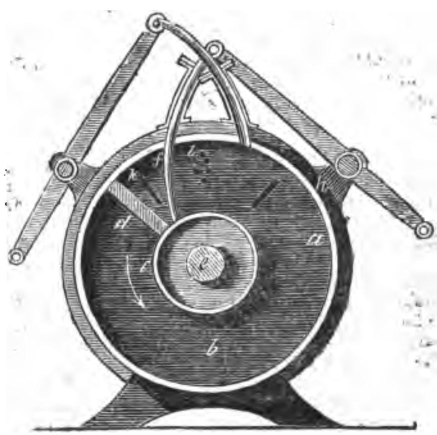
In large houses and establishments where a considerable fire is usually kept up, a very great economy may without doubt be effected, by the domestic production of illuminative gas; and we are not acquainted with any apparatus so well adapted to effect that object, as the two combined inventions of Mr. Pinkus, (described by us in our present and former number,) which we understand has already been most successfully applied in several establishments, and may always be seen in action at No. 178, Strand.

PATENT IMPROVEMENTS IN STEAM BOILERS,

By ANTHONY SCOTT, of the Southwark Pottery, Durham.—*Enrolled January*, 1828.

THE advantage attending the employment of good heat-conducting substances as materials for the construction of steam boilers is entirely counteracted, when their bottoms and sides become incrusted (as is usual) with earthy depositions from the water, which form a non-conducting shield between the heat and the matter to be heated.

To prevent this injurious effect, Mr. Scott places slabs or trays of metal, stone, or wood, near to the bottom of the boiler, which so reduces the agitation of the water during the ebullition, that the sediment descends by its gravity, and deposits itself in the trays instead of the bottom of the boiler. The heat to the water is therefore not intercepted, and the trays are easily removed and cleared of the incrustation.



PATENT ROTARY STEAM ENGINE.

By PAUL STEENSTRUP, Esq. of Basing Lane.—*Enrolled June* 1828.

THE above diagram exhibits a vertical section of the engine.—*a* is the section of a cylinder accurately turned, and bolted at each end to a plate *b*, ground perfectly flat. *c* is a smaller cylinder, to which is attached a rectangular piston *d*; this piston has a metallic packing similar to that in Mr. Galloway's engine, (described p. 37, vol. i. N. S.); *e* is the shaft or axis secured by screws to the small cylinder, and turning in stuffing boxes; *f* a slide moving in circular grooves, cut in each end piece of the cylinder, and in a steam-tight box; *h* is a lever connected by geering to the shaft of the engine, and serving to draw up the slide into the box, in order to allow the piston to pass. The slides are portions of a cylinder, of which the axis of the lever *h* is the centre: *k* is the steam valve; and the holes *l* the eduction passage.

The action is as follows.—The slide *f* being down and resting on the interior cylinder, and the piston in the position shown in the drawing, the steam is admitted by the valve *k*, which impels the piston in the direction of the arrow; and when the piston arrives near to the eduction passage, the steam is cut off, and the piston is carried past the eduction passage by the impetus of a fly wheel on the shaft of the engine, the slide being previously raised into the box to allow the piston to pass; when the piston has passed, the steam is re-admitted, and the operation repeated and continued.

In the case of an engine that never requires its motion to be reversed, only one slide and one steam becomes necessary; but if the power of reversing the action of the engine is required, there must be two slides, and two steam passages, as shown in the drawing.

PATENT PROCESS FOR PRINTING YARNS,

By Benjamin Woodcroft, of Manchester.—*Enrolled September*, 1827.

The great emulation to excel in the multifarious productions of the loom, has led to many very ingenious processes: the subject of the present patent, that of *printing thread*, if not ingenious, is at least one of a singular nature.

The specification states that the yarns of silk, linen, cotton, wool, &c. are evenly wound upon rollers; these rollers are placed in a suitable frame, from which the yarns are passed through reeds, and thence carried by an endless felt, between printing rollers, the engraved pattern on the upper one of which is provided with a mordant or colour, (which of course varies with the device) and impresses the design upon the threads. Thus printed, the yarns are conducted by rollers over a range of boxes heated by steam, by which they soon become dried, and may then be wound upon other rollers, (first passing through reeds to get them even and regular) or they may be separated by passing them through eyes, and winding them upon rollers or bobbins. Upon the final application of these printed threads the specification is silent; but our readers, who are well acquainted with the fabrications of the loom, will understand.

PATENT METALLIC COCKS,

By J. T. Hall, of Leeds, Yorkshire.—*Enrolled January*, 1828.

Cocks employed for the drawing off of beer, wine, and other acetous liquids, are, it is well known, usually made of a peculiar alloy of copper, known in the trade, by the distinctive term, *cock metal*; the proportions are varied according to circumstances, but the constituents of the mixture are copper, lead, and zinc: lead is introduced to lessen the cost, and zinc to give the copper greater hardness. Owing to the great proportion of the copper, it is rapidly dissolved or corroded by the acetous acid of the liquor forming verdigrease, which is a most deadly poison. The alloy is likewise exceedingly brittle, causing the handles and plugs of cocks to be easily broken.

To obviate these inconveniences, and to reduce the cost of such an extensively useful articles, Messrs. Hall and Son have substituted an alloy of lead and zinc, or lead and antimony, either of which may be used; that is to say, to sixteen parts of lead one of zinc, or three of antimony. Those parts of the barrel and plug that come together, are, however, to be bushed with brass, which is best adapted to sustain the effects of friction. The lead of the alloy introduced by the patentees not being acted upon by acetous acid in the cold state, especially when excluded from the air, the corrosion is, of course, very slow; the cocks are not so liable to be fractured, and they are rendered cheap: the chief advantage of them, however, consists in there being little danger in using them, while there is considerable danger of being poisoned by the use of brass cocks.

SCIENTIFIC INSTITUTIONS.

London Mechanics' Institution.—The following Lecture arrangements have been announced to the Members.

Mr. Brayley's course on *Meteorites*, which will be concluded on Friday, the 31st, will be followed by Lectures on the *origin, application and improvement of animal power*, by Dr. Birkbeck. The course on *Practical Mechanics*, by Professor Millington, now in progress, will be succeeded by a Lecture on *Benefit Societies*, by Dr. Mitchell; and a course on *Artificial Illumination*, by T. S. Peckston, Esq.

It has also been announced, that tickets, dating from the 20th October, are now issuing, and persons may become members, and be immediately entitled to attend all the courses of Lectures, the different classes, to the use of the library of circulation and reference, on the payment of the usual small subscription. Lectures are delivered every Wednesday and Friday evening, commencing at half past eight o'clock.

LIST OF EXPIRED PATENTS.

Continued from page 368.

TYPE-FOUNDING.—To A. F. Didot, of Holborn, for an improved method of making types to be used in printing. Dated October 3, 1814.

GLASS CUTTING.—To Abraham Shaw, of Leicester, for an apparatus for the better cutting of window, plate, and other sheet glass. Dated October 3, 1814.

HYDRAULICS.—To W. Sampson, of Acorn Street, London, "for certain improvements for raising water." Dated October 3, 1814.

PLOUGHS.—To R. Phillips, of Newbury, Bucks. for improvements in a plough. Dated October 5, 1814.

N. B.—The above completes the List of Expired English Patents, up to the present time, (October 30, 1828.)

TO OUR READERS AND CORRESPONDENTS.—(SEE ALSO PREFACE).

Lamb's Concentric Circular Proportioner will be described in our next or succeeding Number.

A Carpet Weaver is not intelligible.—R. H.,—W. Smith,—and A Subscriber, are received.

END OF VOL. II.

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